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# GRADUATE SCHOOL

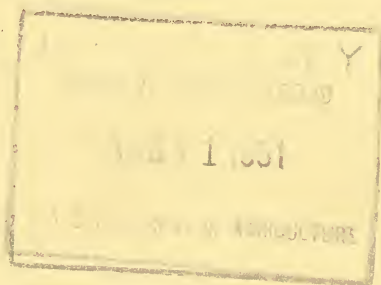
UNITED STATES DEPARTMENT OF AGRICULTURE

## BULLETIN



### *Annual Catalog*

1951-1952



GRADUATE AND UNDERGRADUATE STUDY

WASHINGTON ~ AUGUST 1951

## Calendar for 1951-52

### Fall Semester

Sept. 15-22	Registration (Late fee charged after Sept. 22)
Sept. 24-28	Classes begin
Oct. 5	Last day of registration for credit
	Last day of course transfer without late fee
Oct. 24	Deadline for credit-audit change
Nov. 9	Deferred payments due
Nov. 22	Thanksgiving Day—no classes
Dec. 22-Jan. 1	Christmas holidays—no classes
Jan. 2	Classes resume
Jan. 11	Close of Fall Semester *

### Spring Semester

Jan. 26-Feb. 2	Registration (Late fee charged after Feb. 2)
Feb. 4-8	Classes begin
Feb. 15	Last day of registration for credit
	Last day of course transfer without late fee
Feb. 22	George Washington's Birthday—no classes
March 4	Deadline for credit-audit change
March 21	Deferred payments due
May 16	Close of Spring Semester *

### Summer Session

May 24-29	Registration (Late fee charged after May 29)
June 2	Classes begin
June 6	Last day of registration for credit
	Last day of course transfer without late fee
June 20	Deadline for credit-audit change
July 3	Deferred payments due
July 4	Independence Day—no classes
August 8	Close of Summer Session

\* Classes which have missed sessions for any reason will continue until the deficiency is made up.

SCHOOL ADDRESS: Room 1031, South Agriculture Building, 14th Street and Independence Avenue, Washington 25, D. C.

OFFICE HOURS: 9:00 A.M. to 6:20 P.M. Monday through Friday.

TELEPHONE: Republic 4142, Extension 6337.

CLASSES: Most classes meet in the evening. For exact time of classes, see semester supplement, *Schedule of Classes*.

CLASSROOMS: Classroom assignments are given the student at the time of registration.

BOOKSTORE: Textbooks may be purchased at the Graduate School bookstore, Room 1041, South Agriculture Building. See *Schedule of Classes* for hours.



# GRADUATE SCHOOL

UNITED STATES DEPARTMENT OF AGRICULTURE

# BULLETIN

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FALL — SPRING — SUMMER  
1951 — 1952



*Please keep this catalog for use in  
the Spring and Summer.*

*This Bulletin, published annually by the Graduate School, covers graduate and undergraduate programs for the Fall and Spring Semesters and the Summer Session. It is made as accurate as possible, but the right is reserved to make changes in details as circumstances require. A bulletin on correspondence study is available on request.*

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## *General Information*

### WHAT THE GRADUATE SCHOOL COURSE PROGRAM OFFERS

From its beginning in 1921, the Department of Agriculture Graduate School has undertaken to give mature, intelligent students fundamental education of high quality as well as specialized education to increase their effectiveness in the Federal service. Courses range from cultural to technical, from seminars geared to meet the needs of the few to special series of lectures to attract and instruct the many not interested in regularly constituted courses. The program is developed and adapted in response to expert advice in what is needed to make a distinctive and needed contribution to the educational facilities of the Nation's Capital.

The School, in promoting the advanced education of Department employees, endeavors to adapt its training to the individual needs and interests of its students. This is true in the range of courses offered and in the methods of instruction followed. Graduate study continues to be the primary interest of the School, although the affiliated undergraduate program has now become larger in size. Courses are open to employees of other government agencies and to non-governmental personnel.

### FOUNDING OF THE SCHOOL

The need for research and prolonged investigation grew with the expansion of governmental services in agriculture. In the evolution of the functions of the Department of Agriculture, scientists recruited directly from educational institutions created an intellectual climate conducive to development of post-entry education. With the emergence of a career system in government, greater emphasis was laid upon promotion from within the ranks. Parallelizing these developments came the conspicuous need for further training of employees after entry into government service. So, with the recruitment of young men and women for career service in government, with personnel who had not completed their advanced education, with well educated newcomers to government service who needed the special "know-how" developed in government laboratories was crystallized the need for sound post-entry education.

As the need for qualified personnel became particularly acute after World War I, Congress, too, became cognizant of the fact that the quality of government service would depend greatly on the professional preparation of its employees. Consequently, the Congressional Joint Committee on the Reclassification of Salaries rec-

commended that the government departments give more attention to the development of opportunities within the Federal Service for continued education. Accordingly, in 1920, the Secretary appointed a special committee to explore the matter. After considering the committee's findings and consulting leading educational institutions and other government agencies, the Secretary, in establishing the Graduate School in 1921, announced: "I believe those who may be able to avail themselves of this opportunity will both enrich themselves and enhance the value of the service they render."

#### PURPOSE OF THE SCHOOL

The Graduate School exists to improve employee skills, knowledge and attitudes in the natural and social sciences and to extend educational opportunities to Department employees and to other qualified students. A unique function served by graduate study in the Department of Agriculture has been the bringing together of the novitiates, the young and energetic scientists and technicians, so that they may profit from the large store of learning accumulated by the older men.<sup>1</sup>

In serving these purposes, the Graduate School plays two major roles. In the first, it functions as an educational service agency, coordinating and implementing the educational resources of the Department through programs for trainees and interns, cooperative relationships with land-grant and other institutions, lecture series and educational counseling. In the second role, the School operates as an educational institution, providing evening course programs at various levels. The resident instruction program in Washington is the largest part of the Graduate School's current activities. It has grown from ten courses and approximately three hundred students to over three hundred courses and more than five thousand students. In addition, there is a small correspondence program.

#### ACCREDITED STANDING

The Graduate School does not grant degrees and has never sought that authority; therefore it has not asked to be accredited by any of the accrediting agencies. It prefers to give courses of standard graduate and undergraduate grade; to have the merits of these courses judged by the caliber and well-known competence of

<sup>1</sup> "United States Department of Agriculture Regulations Governing the Graduate School of the Department of Agriculture Promulgated Pursuant to the Authority Contained in the Act of May 15, 1862 (R. S. § 520 (1878), 5 U. S. C. § 511 (1940)), the Joint Resolution of April 12, 1892, 27 Stat. 395, and the Deficiency Appropriation Act of March 3, 1901, 31 Stat. 1010, 1039 (20 U. S. C. Sec. 91 (1940))." (Revised February 21, 1947.)



its instructors; and to cooperate with existing institutions having degree-granting authority.

The United States Civil Service Commission accepts Graduate School credits, the same as those from accredited colleges and universities, for examination and qualification purposes.

#### ADMINISTRATION

The organization and administration of the Graduate School are simple and effective. The government of the Graduate School is vested in a General Administration Board appointed by the Secretary of Agriculture. Functions of this Board, made up of administrative and scientific officials of the Department, correspond in general to those of boards of trustees of universities. The School is administered by a director and a small administrative staff. It is a self-supporting non-profit institution and receives no Federal funds.

The evening program in Washington is organized into eight departments. Each is under an appointed chairman and vice-chairman. These with other persons of broad background and recognized competence, appointed for two-year overlapping terms, comprise a departmental committee charged with responsibility for organizing, evaluating, readjusting, and giving general administrative direction to the programs and activities of the department concerned. Within the departments, depending on the scope and specialization of the programs involved, are divisional and related committees. The eight chairmen, and the Director, make up the Graduate School Council. Similar committees of experts operate with respect to other Graduate School programs.

#### TEACHING AND RESEARCH RESOURCES

The Graduate School supplies some unusual opportunities for high-grade work. It is able to draw to its staff the best trained scholars in the Federal service, which is now a source of talent unexcelled in the nation. Many of these have had, in addition to governmental service, years of college and university teaching experience in the foremost institutions in the United States. As a result, the caliber of the teaching personnel of the School has been compared favorably with that of some of the best graduate institutions in the country. These persons also have had experience in making useful applications of their knowledge so that they can bring to bear on their respective subjects both theoretical and applied considerations.

The quality of the Graduate School staff is equaled by the library and laboratory facilities offered by Washington. In addi-

tion to a large library in the Department of Agriculture itself, containing more than half a million volumes on both agricultural and non-agricultural subjects, students have ready access to the rich storehouse of the Library of Congress, the Smithsonian Institution, and the National Archives. Supplementing the Department Library as necessary, but merged with it, is a growing collection of books supplied directly by the Graduate School.

#### PUBLIC LECTURES AND SEMINARS

Lecture series on current problems serve Department employees and others by giving them an opportunity for closer acquaintance with the problems that are constantly arising, not only in the field of agriculture but in other national and world affairs. Those lectures which are especially geared to the needs and interests of Agriculture employees are given during official working hours. Registration is not required and no fees are charged. Information about some of the lectures planned for 1951-52 will be found in sections of this BULLETIN devoted to the several departments of instruction. During the year, special announcements on these and other lectures will be issued.

#### COOPERATION WITH THE UNIVERSITY OF MARYLAND

To provide broader educational opportunities for those served by each institution, the Graduate School of the United States Department of Agriculture and the University of Maryland have developed a cooperative arrangement under which certain resources of each institution are made available to students of both institutions. Representatives of certain subject matter departments at each institution are engaged in developing integrated educational programs.

Under these arrangements, work taken at the Graduate School of the United States Department of Agriculture may be applied as partial residence credit toward undergraduate or advanced degrees at the University of Maryland. Those wishing to take advantage of this arrangement must work out an approved program of study in consultation with appropriate officials at the University of Maryland. This should be done at a point as early as possible in their programs.

Graduate School students wishing to take advantage of these opportunities may secure instructions from the Registrar.

#### COOPERATIVE INTERNSHIP PROGRAM WITH LAND-GRANT INSTITUTIONS

Post-graduate and post-doctorate personnel in Land-Grant Colleges and Universities are afforded opportunities for research and



for gaining other desirable experience under a program developed jointly by a committee from the Graduate Council of the Association of Land-Grant Colleges and Universities and the Graduate School. This work is under the direction of the Department of Agriculture professional staff in Washington, the Agricultural Research Center and elsewhere. Specific arrangements under this program are between personnel from these educational institutions and agencies in the Department. Details may be had from the Office of Personnel or the Graduate School.

#### CERTIFIED STATEMENTS OF ACCOMPLISHMENT

Certified Statements of Accomplishment are offered in the fields of Accounting, Administrative Procedures, Agricultural Economics, Public Administration, and Statistics upon the student's completion of specified programs of study. Each student interested in earning a Certified Statement of Accomplishment in any of these fields should receive approval, from the Registrar, of his proposed program of study. For complete details see the outlined program in the Department concerned.

These statements are offered to encourage the student to complete a well-rounded approach to his chosen field of study or work, so that he may more competently discharge his present and prospective responsibilities as a public servant. Each student who receives a certified statement will also be given an official transcript of his completed program which he may use as a public record of qualification.

#### GRADUATE SCHOOL PUBLICATIONS

Publications of the Graduate School include:

1. A general annual BULLETIN which contains detailed information about the resident educational program in Washington, D. C.
2. Time Schedule and Supplement, published each semester—fall, spring and summer—which carries added details about the resident educational program in Washington.
3. Books and periodicals, published at irregular intervals containing: original contributions by faculty members; special lectures on subjects devoted to the advancement of the arts, the sciences, and in particular to the development of literature in the field of better government; and significant manuscripts prepared by employees of the Department of Agriculture, which the Department has been unable to publish. A partial list of these publications is given on the outside back cover of this BULLETIN.

# *Regulations and Procedures*

## ADMISSION

Admission to resident courses in the Graduate School is open to all qualified persons.

## ENTRANCE REQUIREMENTS

Since the Graduate School does not offer degree programs, entrance requirements differ with the level of the course for which the student is registering.

Undergraduate courses, in general, are open to persons who are graduates of a standard high school or equivalent or who qualify for the course because of satisfactory work experience. For admission to more advanced courses college work in the same or related field is specified or understood. For other courses definite prerequisites may be stated. Year courses require the completion of the work of the first semester or its equivalent.

## VETERANS

Graduate School courses are available to veterans of World War II under the provisions of Public Laws 346 and 16 as amended. Registration for part-time study is charged against educational benefits only in the proportion that the number of semester hours bears to a full normal load.

Veterans discharged from service before July 25, 1947 must have started or resumed GI Bill training before July 25, 1951 in order to continue training after that date. Veterans discharged after that date have four years from date of discharge to begin their training.

Veterans who are re-entering Graduate School classes after an interruption of training, and those transferring from another institution to the Graduate School, must make all necessary arrangements with the Regional Office of the Veterans Administration to assure VA acceptance.

Veterans intending to enroll in the Graduate School who are eligible for original entrance into training should apply as soon as possible to the Regional Office of the Veterans Administration for an official Certificate of Eligibility and Entitlement showing the amount of educational benefits to which they are entitled. The certificate of entitlement will be accepted by the Graduate School in lieu of tuition fees and charges for books and supplies.

### COUNSELING SERVICES

Officers of the Graduate School are available, throughout the registration periods and from 9:00 a.m. to 5:00 p.m. each day for counseling on educational plans, whether courses are to be pursued in the Graduate School or in other institutions. In addition, where necessary, arrangements are made to refer persons having special problems to authorities in the particular field of work or study.

Careful planning is important for any prospective student, but particularly so for the Federal employee who wishes to make a substantial beginning in his educational program through the Graduate School, where degrees are not granted and credits must eventually be transferred to a degree-conferring institution.

The student who wishes to take an advanced degree should consult in advance the dean of the graduate school of the institution where he expects to become a candidate for his degree. This will enable him to plan his work ahead and to secure approval for whatever portion of it the institution of his choice will accept from the Graduate School. The student who is deficient in basic undergraduate courses needed as a foundation for his graduate program will find many of them available in the large undergraduate program of the Graduate School. Others may be obtained in local universities.

A student who is planning work toward an undergraduate degree should consult in advance the dean of the institution from which he expects to receive the degree if he wishes credit toward the degree for work taken at the Graduate School.

In laying out tentative programs, selecting individual courses, choosing institutions, or planning with other graduate schools, prospective students should always feel free to consult the members of the staff of the Graduate School.

### REGISTRATION

The registration period for each semester is shown on the School calendar on the inside front cover. A late fee per course is charged for registration after the opening of the semester. After the second week of classes in the fall and spring semesters, and after the first week in the summer session, students may register for credit only with the approval of the instructor and the Registrar. Registration is not completed until the required fees have been paid.

### COURSE LOAD

Students employed full time may carry more than two courses only with the permission of the Registrar.

## FEES

*Course Fees.* In general, fees are computed at \$9.00 per semester hour credit for strictly undergraduate courses and \$10.00 per semester hour for graduate and advanced undergraduate courses.

*Late Fees.* There is a \$2.00 per course late registration fee and a \$1.00 per course late transfer fee as shown in the School Calendar.

*Reinstatement Fee.* Students who fail to meet payments when due are charged a reinstatement fee of \$2.00 per course in addition to all accrued fees.

*Laboratory Fee.* Laboratory or materials fees are listed in the Schedule of Classes for each semester, in connection with the courses for which they are charged.

*Service Fee.* A fee of \$1.00 per course is charged each student using the deferred payment plan.

*Transcript Fee.* There is a 50¢ fee for each copy of a student's record on the regular Graduate School form or on the form of another institution or state board of education.

## PAYMENT OF FEES

Fees are due and payable in advance at the time of registration. Registration is not complete and no student is permitted to attend classes until all fees have been paid. Enrollment constitutes an agreement on the part of the student to complete the course unless he meets the withdrawal requirements.

In exceptional cases, an arrangement may be made at the time of registration for payment of fees in two installments, one half plus a service fee at the time of registration, and the balance by the end of the seventh week in the fall and spring semesters, and by the end of the fifth week in the summer session.

The second payment will be due on November 9 in the fall semester, March 21 in the spring semester, and July 3 in the summer session.

A student who fails to meet payments when due will be suspended and may not attend classes until he has been reinstated and has paid all accrued fees as well as a reinstatement fee of \$2.00 per course.

All fees are payable at the Graduate School business office, Room 1031, South Building, United States Department of Agriculture.

## ATTENDANCE AT CLASSES

Students are expected to attend all class sessions and not to absent themselves without adequate reason.



Absences do not relieve the student from responsibility for work required while he was absent, and the burden of proof that the work was done rests with the student. In courses in which the work cannot be satisfactorily tested by written examination, the instructor shall be the judge of the relation of the student's attendance or non-attendance to his grade. A student registered for credit in an undergraduate course who is absent more than 25% of the class periods receives a mark of "W," withdrawn, unless he makes up all required work. Auditors who are absent more than 25% of the class periods receive the mark of "W."

### CREDIT AND GRADES

*Academic Credit.* Persons registering for academic credit must satisfy all prerequisites for admission to the course as generally stated or specified in the course description.

*Audit.* An auditor must meet the same prerequisites as a credit student. He receives full privileges of class participation if he chooses to exercise them. An auditor does not receive a grade; he receives only a mark of AUD.

*Change from Audit to Credit.* A student may change his registration from audit to credit, or vice versa, within thirty days after the beginning of the semester in the fall and spring, and within three weeks after the beginning of the summer session. The request for change must be made in writing to the Graduate School. Special forms are available at the School office.

*Grades.* At the close of the semester students receive written notice by mail of grades received. The following letter grades are used:

A	Excellent
B	Good
C	Fair
D	Passable
F	Failure
Aud	Auditor
Inc	Incomplete
W	Withdrawn

### TRANSCRIPT OF CREDIT

*Inclusion in Personnel Record for Department of Agriculture Employees.* To aid in effecting its promotion-from-within policy, the Department has provided (USDA Administrative Regulations, Title 8, Chapter 42, paragraphs 1548-1551, dated 10-13-48) that a

record of Graduate School credits earned by its employees will be placed in official personnel files of the agency. Unless specifically requested by the employee that such action not be taken, the Graduate School will forward, upon completion of the courses or at the end of the year, a copy of the student's record, without cost to the employee, to the personnel officer of the administration, bureau or office in which the student is employed.

*Certification on Request.* Upon a student's written request and the payment of the transcript fee, an informational record or an official transcript will be sent to him or to an agency or institution designated by him. An official transcript will be sent only when the student has filed with the Graduate School a transcript of his previous academic work showing that he has met all requirements for admission to the level of the courses for which he registered.

### WITHDRAWAL AND REFUNDS

Application for withdrawal from Graduate School classes must be made in writing to the Registrar. A form for this purpose is available in the Graduate School Office. *Reporting the dropping of a course to an instructor does not constitute an official withdrawal.* Permission to withdraw will not be given to a student who does not have a clear financial record.

Refund of tuition fees only will be granted in cases of official withdrawal according to the following schedule:

<i>Fall and Spring Semesters</i>	<i>Refund</i>
During first and second weeks of term	Tuition less \$5.00 per course registration fee.
During third and fourth weeks of term	60% of tuition (a minimum of \$5.00 per course will not be refunded).
During fifth and sixth weeks of term	40% of tuition.
<i>Summer Session</i>	
During first week of session	Tuition less \$5.00 per course registration fee.
During second week of session	60% of tuition (a minimum of \$5.00 per course will not be refunded).
During third week of session	40% of tuition.

*Refunds will be computed as of the date the application for withdrawal is received in the Graduate School Office.* In no case will tuition be reduced or refunded because of non-attendance in

classes. No refund will be made of laboratory or other incidental fees.

Since commitments for instruction and other arrangements are necessarily made in the beginning of the semester, no refunds for any reason can be made except in accordance with the above schedule.

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The Graduate School reserves the right to cancel any course if registration does not warrant continuance; to discontinue, postpone or combine classes; to change instructors; to change classroom assignments; to make any changes deemed advisable in registration and in fees; and to require the withdrawal of any student at any time for such reasons as the School deems sufficient.

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### *Courses of Instruction*

Courses given during the academic year 1951-52 are listed on the following pages by departments of instruction. The departments are listed alphabetically.

The words Fall, Spring and Summer indicate the semester in which the course is offered. The number of credits indicates the value of the course in semester hours. Bracketed numbers indicate courses which will not be given in 1951-52.

Courses numbered 1-100 are non-credit; 100-399, undergraduate; 400-699, advanced undergraduate (senior) and graduate; above 699, graduate only.

# Biological Sciences

## DEPARTMENTAL COMMITTEE

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EDWARD H. GRAHAM (Vice-chairman)

E. L. LECLERG

DANIEL L. LEEDY

O. E. REED

WILLARD H. WRIGHT

RAYMUND L. ZWEMER

—O—

Scientific efforts have been greatly intensified in recent years with the result that research discoveries and subsequent developments have a direct bearing on the activities of every individual and organization. Many government workers in fields only indirectly related to biology often need an understanding of basic principles in the biological sciences to do a competent job in their own fields. On the other hand, government workers in the biological sciences are continually faced with the problem of keeping abreast of the rapid advances in the application of these principles and new gains in basic knowledge. The Department of Biological Sciences has arranged a series of courses to meet the needs of each of these groups. These courses are taught by outstanding specialists from Federal and other research institutions. To permit wide discussion, courses for advanced students are arranged as seminars.

—O—

### 101. General College Zoology

Fall, 4 credits (alternate years)

MERIBETH J. MITCHELL

Introduction to the major groups of animals. Structure and function stressed. Principles of genetics, ecology and evolution included. Lecture and laboratory. The class meets in the Biology Laboratory of Wilson Teachers College.

### 102. General College Botany

Spring, 4 credits (alternate years)

MERIBETH J. MITCHELL

Introduction to the structure and function of the major plant groups. Anatomy, morphology, physiology and heredity of seed plants included. Lecture and laboratory. The class meets in the Biology Laboratory of Wilson Teachers College.

### 209. Systematic Botany—Principles of Classification

Fall, 2 credits (alternate years)

SIDNEY F. BLAKE

An introductory course intended to give those with no previous experience in systematic botany an acquaintance with the subject sufficient to enable them to use the ordinary manuals to advantage. Begins with a study of the morphology of the flower, fruit, leaf, stem, and other parts used in classification and of the technical terms used in describing them. A survey of the principal families



of flowering plants with discussion of their distinctive characters and mention of the economically important species, illustrated by herbarium specimens; and a summary of the principal systems of plant classification. *Prerequisite:* College biology or consent of instructor.

## 210. Systematic Botany—Identification Techniques

Spring, 2 credits (alternate years)

SIDNEY F. BLAKE

Devoted to the identification of wild plants of this region by the use of Gray's Manual of Botany, giving the student familiarity with the descriptive terms used and a first-hand acquaintance with the principal plant families. One or more short field trips will be made. *Prerequisite:* College biology, systematic botany, or consent of instructor.

## 213. Identification of Local Plants

Summer, 2 credits

EGBERT H. WALKER

An elementary course, with no prerequisites, dealing with the process of determining the names of the plants, both wild and cultivated, trees, shrubs, herbs and wild flowers, of the vicinity of Washington, D. C. The work will include discussion of the books and keys to the plants, the language they are written in, and how to use them. Most of the work will be with actual plants, largely those brought in by the students or gathered on class field trips. Instruction and demonstration will be given in the methods of pressing, drying, and mounting plant specimens.

## 214. Birds of the Washington Area

Summer, 2 credits

CHANDLER S. ROBBINS

Introduction to birds of the District of Columbia region, stressing field identification, but touching on classification, distribution, migration, nesting, ecology and research methods. Museum collections of birds will be inspected and recordings of bird songs will be available in addition to the field trips.

## [250.] Bacteriology (1952-53 and alternate years)

Fall, 4 credits

MERIBETH J. MITCHELL

## [300.] Fundamentals of Entomology (1952-53 and alternate years)

Spring, 3 credits

REECE I. SAILER

## [320.] Human Physiology (1952-53 and alternate years)

Spring, 4 credits

HENRY W. OLSON

## 340. Principles of Mammal and Bird Control

Fall, 2 credits (alternate years)

CLIFFORD C. PRESNALL, WALTER W. DYKSTRA and SPECIALISTS

The philosophies, policies, and practices of controlling excess populations of wildlife species detrimental to agriculture, forestry, soil conservation, and game management. Crude pioneer methods, including bounty hunting, are contrasted with modern methods devised and used in conformity with economics, environmental factors, and population dynamics. Latest developments in control of rats and other harmful species, including chemical and pharmaceutical aspects of poisons. Lectures by outstanding specialists and discussions of practical problems in the application and administration of control methods. *Prerequisite:* Basic courses in biology and chemistry or consent of instructor.

**512. Medical and Veterinary Entomology**

Year, 2 credits each semester (alternate years)

F. C. BISHOPP

A timely general course in medical entomology with emphasis on the practical aspects of this important field. The biology, habits, and relation to disease of insects, spiders, mites, and ticks, are discussed. How these arthropods affect man and animals as intermediate hosts, or carriers of disease-producing organisms, is given attention and special consideration is given methods of control. The adaptation of known control procedures to present-day problems is considered. Features of the course include lectures by outstanding specialists in this general field and round-table discussions of practical problems. *Prerequisite:* Basic training in entomology or consent of instructor.

**[518.] New Developments in Insecticides (1952-53 and alternate years)**

Fall, 2 credits

F. C. BISHOPP and SPECIALISTS

**[519] New Developments in Fungicides**

Fall, 2 credits

JOHN C. DUNEGAN, M. C. GOLDSWORTHY and SPECIALISTS

**603. Advances in Plant Breeding and Genetics**

Fall, 2 credits (every third year)

MARTIN G. WEISS and SPECIALISTS

Methods of breeding naturally self- and cross-pollinated plants, theories of early generation testing, nature and use of heterosis in plant breeding, techniques of self-pollination and hybridization, and plant improvement through interspecific hybridization and polyploidy. *Prerequisite:* Basic knowledge of genetics and plant breeding.

**[608.] Advances in Human and Animal Nutrition (1952-53 and alternate years)**

Spring, 2 credits

PAUL E. HOWE

**[609.] Recent Developments in Plant Physiology**

Fall, 2 credits

FRANK P. CULLINAN and SPECIALISTS

**[610.] Recent Developments in Plant Nutrition (1952-53 and alternate years)**

Fall, 2 credits

MARION W. PARKER and SPECIALISTS

**[620.] Advances in Weed Control Practices (1952-53 and alternate years)**

Spring, 2 credits

WARREN C. SHAW, R. L. LOVVRON and SPECIALISTS

**[700.] Progress in the Field of Antibiotics (1952-53 and alternate years)**

Fall, 2 credits

GEORGE W. IRVING, JR., THOMAS D. FONTAINE and SPECIALISTS

**[701.] Virus Diseases of Man and Animals**

Spring, 2 credits

**[702.] Radioisotopes and High Energy Radiation in Biology (1953-54 and every third year)**

Spring, 2 credits

B. T. SHAW, STERLING B. HENDRICKS and SPECIALISTS

# Languages and Literature

DEPARTMENTAL COMMITTEE

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GEORGE E. BEAUCHAMP  
J. P. BLICKENSERFER  
JAMES O. HOWARD  
ERWIN JAFFE

J. KENDALL McCLARREN (Vice-chairman)  
LESTER A. SCHLUP  
FRANKLIN THACKREY  
R. LYLE WEBSTER

## IMPORTANCE OF ENGLISH, WRITING AND SPEECH

Among students preparing for technical careers and among busy people employed on the basis of their technical competence, there is an inevitable tendency to concentrate on subject-matter specialties, to the great neglect—if not exclusion—of the auxiliary subjects that can effectively implement such specialties. It is common knowledge in the Government service that nothing so much retards the progress of many young technicians, scientists, and other professional personnel as their inability to incorporate the results of their thinking and of their research in effective, concise, lucid English, written or oral. Technical knowledge is of no value unless it can be communicated to others. There are indeed few persons who cannot greatly benefit from the further sharpening of their tools of communication.

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## ENGLISH AND LITERATURE

### 80. Playwriting Workshop

Year, non-credit

TERRENCE W. McCABE

An active participating class for those who have written or are writing plays. Study and analysis of playwriting techniques. Student plays will be read in class by actors and criticized by the class. Plays meriting public showing will be considered by the Agriculture Players for production.

### 118. Practical English Usage

Fall, 2 credits. Repeated in Spring and Summer

CHARLOTTE MANGOLD  
VERNE L. SAMSON

This course enables students through practice to master the fundamentals of correct English. Troublesome problems of English usage, sentence structure, choice of words, style, and grammar, are studied as aids to clear and forceful writing of letters, memoranda, and reports.

### 119. Vocabulary Building

Fall, 2 credits. Repeated in Spring and Summer

CHARLES D. MURPHY

Designed to help writers and speakers express ideas clearly and attractively. It embraces word study and selection, diacritical markings, synonyms and antonyms, prefixes and suffixes, usage exercises, and other means of developing a broad and useful command of words.

**222A. English Composition**

Fall, 3 credits. Repeated in Spring and Summer

FRANCES H. MILLER

Equivalent of freshman English. An introductory course in writing and English usage, designed especially for those who need a course preparatory to more advanced English studies. Special attention given to the fundamental principles and mechanics of good writing—grammar, punctuation, spelling, diction, etc. Exercises in writing short and long themes and in studying, analyzing, and evaluating selected English prose texts.

**222B. English Composition**

Spring, 3 credits. Repeated in Summer

JAMES G. HARMON  
CHARLOTTE MANGOLD

Continuation of course 222A above.

**223. Descriptive English Grammar**

Fall, 2 credits. Repeated in Spring and Summer

SUSAN E. HARMAN

A course in the study of grammatical principles, stressing sentence structure and correct English form. Lectures on the history and development of inflectional and derivational forms. Exercises in diagramming and in analyzing examples of good and bad English.

**235. Fiction Writing**

Fall, 2 credits

HAROLD E. CHRISTIE

Stresses such fiction fundamentals as plotting, characterization, dialogue, story organization, testing readability and interest, and increasing dramatic quality of writing. Emphasizes writing techniques which increase salability of student manuscripts by discussing editorial taboos, ways to obtain salable story ideas, and methods of marketing manuscripts. *Prerequisite:* English Composition or equivalent, or permission of instructor.

**242. Fiction Writing Workshop**

Spring, 2 credits

HAROLD E. CHRISTIE

Discussion, criticism and suggestions for revising student manuscripts. Emphasizes methods of slanting for particular markets, discussions of what editors buy and why, and ways to polish manuscripts to increase sales possibilities. *Prerequisite:* Fiction Writing or equivalent.

**330. Great Books**

Year, 2 credits each semester \*

M. CLARE RUPPERT

Group discussion, under leadership, of important works in poetry, history, philosophy and criticism. The leader will try to help with the reading and understanding, but the books themselves will be the teachers. The intention of the course is to give insight into perennial, and therefore contemporary, problems, not historical and literary information. The only qualifications required are an interest in ideas and belief in free discussion. With few exceptions the books will be read in their entirety. One, two, or three meetings will be given to a book depending upon its length. Discussion will center around the following authors:

*Fall Semester:* Homer, Sophocles, Aeschylus, Thucydides, Herodotus, Plato, Aristotle, Lucretius, Tacitus, Marcus Aurelius, Augustine, Thomas Aquinas.

*Spring Semester:* Dante, Machiavelli, Shakespeare, Hobbes, Rousseau, Swift, Goethe, Kant, Marx, Henry Adams.

\* Students may attend both semesters or either semester.



## SPEECH

**228. Fundamentals of Speech**

Fall, 2 credits. Repeated in Summer

VIRGINIA B. ROSER

Through the preparation and delivery of short original speeches the student gains poise, assurance, and the ability to express himself clearly and accurately. Strict adherence to time limit quickens mental processes and develops discrimination in the selection of speech material. Voice, articulation, and pronunciation drills. Posture, movement, and gesture. Learn to speak by speaking at each class meeting. Constructive criticism.

**229. Public Speaking**

Spring, 2 credits

GEORGE E. BEAUCHAMP

Theory and practice of effective speaking through: (1) audience analysis, (2) organization of speech material to achieve a specific response, (3) delivering speeches for special occasions (radio, good will, welcome, presentation, acceptance, etc.), (4) officiating at banquets. Each student speaks at every class meeting. It is assumed that the student has some knowledge or experience in speech making.

**232. Voice and Remedial Speech**

Fall, 2 credits. Repeated in Summer

WALTER B. EMERY

Study and intensive drills in voice production, flexibility, range, articulation, and enunciation. Training and practice are designed to improve vocal conditions for all speech purposes and to remedy minor speech difficulties. In order that students may receive more individual attention, registration is limited to twenty.

**234. Correction of Speech Dialect**

Spring, 2 credits

WALTER B. EMERY

Designed for persons having local or foreign dialect wishing to acquire standard American pronunciation and speech; intensive phonetic studies and drills to help the student hear properly and produce correctly American speech sounds and to avoid deviations therefrom; special reading and speaking exercises to improve diction and conversational ability; training is designed to serve individual needs.

**350. Conference Methods and Procedures**

Spring, 2 credits

GEORGE E. BEAUCHAMP

For persons who take part in formal or informal meetings either as chairmen, leaders, or participants. How to develop and work within an effective agenda, stimulate profitable discussions and arrive at worthwhile and equitable conclusions. How to develop and express one's point of view effectively in discussion.

**400. Persuasive Speaking**

Fall, 2 credits

GEORGE E. BEAUCHAMP

A course designed for persons who have previously had a beginning course or some practical experience in public speaking. Special attention is given to organization, writing, and style of speeches, and to human motivation as influenced by emotion, rationalization, stereotypes, prejudice, and the will-to-believe.

## INFORMATION METHODS

**75. Introduction to Library Techniques**

Year, non-credit

MARIETTA DANIELS

Emphasis on methods and techniques used in processing the books in libraries: order and accession records, cataloging and classification records, circulation records, shelf list, filing inter-library loan records, introduction to general reference books. Actual work with books, records and filing.

**120. Indexing**

Fall, 1 credit

MABEL H. DOYLE

This course is intended primarily for those interested in making indexes for periodicals, bulletins, reports, and books. Emphasis will be placed on general procedures and matters of policy as well as on basic principles and techniques. Specific types of indexing adapted to various subjects and popular style, contrasted with technical and scientific styles, will be studied. Examples of different kinds of indexes will be shown and opportunity given for practical work in the preparation of indexes, including the making of cross references, alphabetizing, and editorial preparation of index cards and manuscripts for the printer.

**[200.] Readable Writing (1952-53 and alternate years)**

Spring, 2 credits

AMY G. COWING and HARRY MILEHAM

**225. Principles of Editing and Their Application**

Fall, 3 credits

ROY E. MILLER and SPECIALISTS

Intended primarily for those seeking information on editorial techniques involved in handling manuscripts after they leave the author's hands and until they are issued in printed form. Discussion of the fundamental principles of editing, including the organization or rearrangement of material for effective presentation; rhetorical style in relation to subject matter; word forms, sentence structure and effective use of English; the Style Manual of the Government Printing Office; considerations governing titles, tables of contents, headings, footnotes, illustrations, literature citations and bibliographies, and statistical checking; the principles of table formation and arrangement; the relation of type to subject matter and the techniques of printing; and the fundamentals of indexing and proofreading. Opportunity is afforded to apply these principles in practical work in editing, which is then discussed in class. A trip to the Government Printing Office is arranged to note and study operations there.

**226. Introduction to Official Writing**

Fall, 2 credits

J. KENDALL McCLARREN and MARGUERITE GILSTRAP

This course covers the principles of clear statement that must be applied to all forms of writing. Emphasis is given to the special requirements of official writing within the boundaries of economic and scientific research, government organization, and official policy. Frequently these limitations lead to a style that is wordy and lifeless. The course, which presupposes some writing experience, considers ways of making official writing clear, vigorous, and readable in spite of the necessary rules and restrictions. One major writing project is required.

**237. Government Printing Procedure**

Spring, 2 credits

LOUIS H. ANDERSON

Intended for those who plan, prepare, or procure printing, duplicating, and distribution of books, pamphlets, folders, posters, charts, forms and other printed or duplicated matter. Subjects covered include: analysis of manuscript copy and

its purpose to determine format and method of production; organization of copy for effectiveness; copy fitting and measuring; ways to aid the reader to grasp the message of the printed word; legibility and readability; type faces and typography; illustrations; printing and duplicating processes and criteria for their use; paper; binding methods; preparation of copy for duplicator and printer; handling of proofs; specifications and cost factors; and channels and methods of distribution of Government publications. The knowledge of methods and procedures to be acquired from this course is intended to give the student competence and confidence in dealing with author and editor, and printing, duplicating and distribution technicians.

## **240. Audio-Visual Aids in Information and Education**

Fall, 2 credits

SEERLEY REID and R. LYLE WEBSTER

A survey of the many ways audio-visual aids can be used in training, employee relations, and information and education programs. Covers not only newer materials such as motion pictures, filmstrips, and recordings, but also modern uses of photographs, charts, graphs, maps, and the like—even the art of using a blackboard. Gives practical suggestions on the most effective use of these aids for different purposes—developing physical skills, imparting information, changing attitudes, and otherwise influencing human behavior. Lectures and demonstrations with guest speakers presenting material on special topics. Each student will have the opportunity to choose his own problem for intensive study.

## **241. Audio-Visual Aids for Community Activities**

Spring, 2 credits

R. LYLE WEBSTER and SEERLEY REID

A survey and analysis of audio-visual aids, particularly motion pictures, which can be made a part of community programs such as those of citizens' associations, Parent-Teacher associations, recreational organizations, municipal planning bodies, church groups, lay health organizations, Boy Scouts. Especially useful for organization officers and program chairmen. Subject matter includes principal audio-visual aids such as motion pictures, film strips, records, charts, photographs, and exhibits. Classes typically will review films suitable for community programs and work out possible program uses built around such film or other visual materials. Sources of audio-visual material will be studied and instruction provided in the essentials of projecting film materials. Class work will be directed at actual community problems of students to the fullest extent possible.

## **247. News Writing**

Spring, 2 credits

RICHARD S. FITZPATRICK

What news is; structure of the news story; writing the news story; news story style. The role of the reporter; the reporter as a specialist. Objectivity in the news story; interpretation and explanation in the news story; backgrounding the news; readability in news. Handling of news stories by newspapers, press associations and news magazines. News writing for radio. Libel. Use of the news story in public information programs. *Prerequisite:* English Composition or equivalent, or permission of instructor.

## **250. Interpretive Writing on Official Action**

Spring, 2 credits

J. KENDALL MCCLARREN and MARGUERITE GILSTRAP

This course presents informally the elements of explaining official activities through newspaper releases, magazine articles, printed reports, radio scripts, and other public media. The workshop method is followed so far as practical with practice in the preparation of background and interpretive material on government research, programs, and policies. *Prerequisite:* Introduction to Official Writing or equivalent.

**280. Feature Writing**

Fall, 2 credits

HAROLD E. CHRISTIE

Stresses how to find article ideas, how to do the research necessary to develop them into salable articles, best methods of presentation of material, ways to polish writing to make it more salable, ways to determine magazine needs, how to slant material for particular magazines, and how to test readability and interest of writing. *Prerequisite:* English Composition or equivalent, or permission of instructor.

**281. Feature Writing Workshop**

Spring, 2 credits

HAROLD E. CHRISTIE

Discussion, criticism and suggestions for revising student manuscripts. Emphasizes methods of slanting for particular markets, discussions of what editors buy and why, and ways to polish manuscripts to increase sales possibilities. *Prerequisite:* Feature Writing or equivalent.

**360. Advanced Practice in Editing**

Spring, 2 credits

GENIANA R. EDWARDS and SPECIALISTS

Advanced instruction in literary and statistical editing and the preparation of tables. The class will work on editorial material provided by the instructor or submitted by the students. *Prerequisite:* Principles of Editing and Their Application or consent of the instructor.

**440. Television Programing**

Fall, 2 credits (alternate years)

KENNETH M. GAPEN and MAYNARD A. SPEECE

Discussion, demonstration and analysis of the integral components of television programing, on a practical problem basis. Emphasis on visuals, packaged programs, television facilities, financing program costs, program techniques, and program evaluation. The course will concentrate chiefly on the expanding role of television in disseminating agricultural and consumer information. It will serve also as a means of reporting and interpreting results of the RMA television research project. Basic problems, methods, techniques, etc., included in the course will have application to the information work of other branches of Government. *Prerequisite:* Experience or training in information, radio or news writing, publications, visual aids, or related fields.

**FOREIGN LANGUAGES**

The unprecedented expansion of international activities has greatly increased interest in the study of foreign languages. Research workers, those employed in all aspects of international relations, and those scheduled for foreign assignments are in need of foreign-language instruction. With the expansion of international land, water and air transportation many persons find it desirable to improve their facility of speech in some foreign language before visiting our world neighbors.

The Graduate School provides opportunities for instruction in a wide range of foreign languages. The person who is seeking the maximum practical value from a foreign language must learn not only to translate it but to think in it well enough for translation to be unnecessary. It is the aim of those responsible for these courses



to conduct them so as to develop in their students a ready and intelligent use of the language.

### *Intensive Language Instruction*

The Department of State is authorized to provide language training, through the Foreign Service Institute, for Federal employees who are certified by their agencies as requiring language training to perform necessary duties in connection with definite foreign assignments. Upon written certification by the agency, official arrangements may be made to place such persons in one of the regular intensive language classes offered by the Foreign Service Institute, depending upon the availability of facilities. Such training will be given on official time at no cost to the student. Information may be obtained from the Registrar or directly from the School of Language Training, Foreign Service Institute, Department of State.

### *Additional Courses*

Groups of students desiring instruction in any language not scheduled in this BULLETIN or in a specialized scientific field are requested to notify the Graduate School of their interest. If a sufficient number are interested, an instructor will be secured and all necessary arrangements made to offer the course.



Unless otherwise specified, all foreign language courses are organized as follows:

*Elementary year*—foundation work in grammar, vocabulary, reading, and translation, with some conversation.

*Intermediate year*—grammar review, more difficult reading and translation, use of idioms, writing and discussion in the language.

*Conversation*—development of facility in discussion and reading, use of idioms, writing and thinking in the language without translating.

## FRENCH

### 253A. Elementary French

Fall, 3 credits each semester. Repeated in Spring and Summer

JACK C. ARNOULD  
HENRI DE MARNE  
ANNE SEILLIERE

### 253B. Elementary French

Spring, 3 credits. Repeated in Summer

JACK C. ARNOULD  
ANNE SEILLIERE

**254. Intermediate French**

Year, 3 credits each semester

JACK C. ARNOULD

**255. French Conversation**

Year, 2 credits each semester

HENRI DE MARNE

**40. Everyday French**

Summer, non-credit

JACK C. ARNOULD

Accuracy and facility in the use of oral French will be attempted through use of dictation, conversation, and other devices. The work will be adapted to those entering the course. The course is designed especially for those who wish to acquire fluency in the spoken language of today. *Prerequisite:* One year of French.

**GERMAN****259A. Elementary German**

Fall, 3 credits. Repeated in Spring and Summer

MARIANNE LEDERER  
JOSEPH PONTI**259B. Elementary German**

Spring, 3 credits. Repeated in Summer

MARIANNE LEDERER  
JOSEPH PONTI**260. Intermediate German**

Year, 3 credits each semester

MARIANNE LEDERER

**261. German Conversation**

Year, 2 credits each semester

MAGNA E. BAUER

**41. Everyday German**

Summer, non-credit

ZITA PONTI

Accuracy and facility in the use of oral German will be attempted through the use of dictation, conversation, and other devices. The work will be adapted to those entering the course. The course is designed especially for those who wish to acquire fluency in the spoken language of today. *Prerequisite:* One year of German.

**ITALIAN****270. Elementary Italian**

Year, 3 credits each semester

JOSEPH PONTI

**[271.] Intermediate Italian****RUSSIAN****295A. Elementary Russian**

Fall, 4 credits. Repeated in Spring

GEORGE M. KORENEV ROCKWELL  
ERIC T. SCHULER  
EUGENIA TARAKUS

## 295B. Elementary Russian

Spring, 4 credits

GEORGE M. KORENEV ROCKWELL  
ERIC T. SCHULER  
EUGENIA TARAKUS

## 296. Intermediate Russian

Year, 3 credits each semester

GEORGE M. SAHAROV

## 299. Advanced Russian

Year, 3 credits each semester

GEORGE M. SAHAROV

## 45. Review of Elementary Russian

Summer, non-credit

GEORGE M. SAHAROV

General review of Russian grammar, accompanied with oral and written exercises. *Prerequisite:* A year course in elementary Russian, or the equivalent as approved by instructor.

## SPANISH

## 300A. Elementary Spanish

Fall, 3 credits. Repeated in Spring and Summer

ERWIN JAFFE  
MARJORIE C. JOHNSTON

## 300B. Elementary Spanish

Fall, 3 credits. Repeated in Spring and Summer

ERWIN JAFFE  
MARJORIE C. JOHNSTON

## 301. Intermediate Spanish

Year, 3 credits each semester

JOSE GARCIA-TUNON

## 302. Spanish Composition and Conversation

Year, 2 credits each semester

G. MEDRANO DE SUPERVIA

Thorough training in the structure of the language, through reading and discussion of Spanish newspapers, magazines and novels of today. Writing of compositions, commercial and familiar letters; helping student acquire ability to speak and understand everyday and colloquial Spanish. *Prerequisite:* Intermediate Spanish or equivalent.

## 574. Advanced Spanish Conversation and Literature

Year, 2 credits each semester

RAFAEL SUPERVIA

Especially adapted for those having a fair knowledge of the Spanish language, who want to improve it by the readings of and comments on the masters of Spanish literature. *Prerequisite:* Ability to read, understand, and express oneself clearly in Spanish.

## 47. Everyday Spanish

Summer, non-credit

JOSE GARCIA-TUNON

Accuracy and facility in the use of oral Spanish will be attempted through the use of dictation, conversation, and other devices. The work will be adapted to those entering the course. The course is designed especially for those who wish to acquire fluency in the spoken language of today. *Prerequisite:* One year of Spanish.

# Mathematics and Statistics

DEPARTMENTAL COMMITTEE

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JOSEPH F. DALY

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MORRIS H. HANSEN

EARL E. HOUSEMAN

B. R. STAUBER (Vice-chairman)

## THE STATISTICIAN AND HIS EDUCATION

Unprecedented dependence is being placed on statisticians by administrative officials in government and private business all over the world. The statistician, through his specialized training, is able to provide current and comprehensive information on many subjects, and to do so with speed and economy.

Competent statisticians are accordingly in great demand, in government, business, and for teaching positions in the universities; the demand will exceed the anticipated supply for many years. The making of a statistician is a long and exacting process—several years of graduate study, plus at least a year and a half of high-grade experience under competent leadership. Educational facilities are strained, not only because of the heavy and increasing demand but also because the educational requirements placed on the statistician today are of an entirely different order of magnitude than they were a few years ago.

Statistical training is recognized as a necessary adjunct in such fields as engineering, biology, agricultural science, business, sociology, economics, public opinion, and other branches of the natural and social sciences. Training in these professions is now regarded as incomplete without mathematical and statistical studies, through intermediate grades at least. Courses are offered by the Graduate School to provide this kind of training.

The statistician is particularly equipped by training and experience to assist in the formulation of scientific courses of action in government, manufacturing, and distribution. He must know when data are needed and how much precision is required, and what the cost should be. He is expected to be expert in the collection, analysis, interpretation, and presentation of quantitative information. He may be called upon to administer a statistical organization. He must therefore be familiar with problems of classification and definition. He is expected to be expert in the design of questionnaires and sampling procedures, and must therefore know field-work and costs. The courses described on the following pages accordingly provide training not only in theoretical principles, but training also in the administrative and research uses of

data, as well as in the collection and processing of data and in the development and supervision of the minor skills necessary for carrying out statistical work.

In the design of a survey the statistician is concerned with the reliability and the cost of the figures that are to be obtained. Reliability is affected by many sources of error, which can be classified under two groups: (a) biases that are common to both complete counts and samples; (b) sampling errors. A thorough understanding of both types of error is essential in the work of the statistician. The statistical courses listed on the following pages deal mainly but not entirely with sampling errors. Proficiency in one or another branch of subject-matter such as sociology, economics, agricultural science, engineering, or some other specialized field, is essential for a full appreciation of the first type of error and for that reason collateral studies in one or more fields of science are advised and in fact are insisted upon in work leading to a Certified Statement of Accomplishment in Statistics.

#### CERTIFIED STATEMENT OF ACCOMPLISHMENT IN STATISTICS

A Certified Statement of Accomplishment is offered in each of three fields of statistical study—fields representing areas of statistical preparation and application most useful in the public service. The required program in each field is outlined on page 30. The student who holds a bachelor's degree and who completes the basic courses and earns 24 credits in specialized courses listed in any column, with substitutions only as specifically approved, is eligible to receive a Certified Statement of Accomplishment. It certifies that the student has completed a program of study which, in conjunction with collateral training in a subject-matter field of application, prepares him for effective public service in a particular statistical field.

#### INTERNSHIPS IN SAMPLING

##### COMMITTEE

W. EDWARDS DEMING (Chairman)

WILLIAM G. COCHRAN

MORRIS H. HANSEN

STERLING R. NEWELL

S. MCKEE ROSEN

IRVING SIEGEL

FREDERICK F. STEPHAN

ARYNESS JOY WICKENS

In recognition of the need for statisticians with thorough theoretical training and with experience in large-scale statistical projects under competent leadership, and in recognition of the exceptional facilities in Washington for specialized training in this field, the Graduate School has undertaken to present to qualified students the opportunity to pursue their studies under a system of internships.



# COURSES LEADING TO CERTIFIED STATEMENTS OF ACCOMPLISHMENT IN STATISTICS

(With Concentration in One of the Following Fields of Application)

## THE SOCIAL SCIENCES

College Algebra, Plane Trigonometry and  
Analytic Geometry  
Principles of Statistical Analysis

## THE NATURAL SCIENCES

### BASIC COURSES—Required of all candidates

College Algebra, Plane Trigonometry and  
Analytic Geometry  
Calculus  
Principles of Statistical Analysis

## MATHEMATICAL STATISTICS

### SPECIALIZED COURSES

206. Calculus  
400. Introduction to Mathematical Statistics  
436. Questionnaire Construction and Interviewing  
437. Market Opinion Research  
448. Population Statistics I  
449. Population Statistics II  
520. Government Statistics  
548. Statistical Analysis of Economic Relationships  
700. Population Statistics III  
735. Theory of Sample Surveys  
753. Recent Developments in Statistical Concepts

206. Calculus  
400. Introduction to Mathematical Statistics  
507. Statistical Methods in Engineering and Industrial Production  
535. Statistics of Bio-Assay  
571. Design and Interpretation of Experiments in Physical Sciences  
570. Design of Experiments in Biological Sciences  
704. Interpolation, Approximation, and Mechanical Quadrature

400. Introduction to Mathematical Statistics  
500. Advanced Calculus  
708. Linear Algebra  
710. Applications of Linear Regression  
712. Theory of Functions  
723. Design and Interpretation of Experiments  
735. Theory of Sample Surveys  
741. Theory and Application of the Characteristic Function  
751. Theory of Measure  
752. Advanced Theory of Probability

### ELECTIVE COURSES

420. History of Mathematics  
435. Sampling in Social and Economic Surveys  
500. Advanced Calculus  
502. Differential Equations

709. Theory of Infinite Processes  
712. Theory of Functions  
741. Theory and Application of the Characteristic Function  
752. Advanced Theory of Probability

Under this program a limited number of qualified persons have a unique opportunity to combine advanced study with practical experience in sampling.

### Program

The internships provide opportunity for research work under leading authorities. The program is planned on an individual basis, depending on the experience, training and interests of the candidate. The internships are intended to supplement, not supplant, work offered in universities.

Included among the agencies to which interns may be assigned are:

Bureau of Agricultural Economics	Bureau of the Census
Bureau of the Budget	Bureau of Labor Statistics
National Bureau of Standards	

Each intern, and his program, is approved by the agency to which he is assigned.

The internship consists of two integrated parts:

- (1) classroom training, planned to strengthen previous training, in courses at the Graduate School or at other educational institutions in the city;
- (2) work experience in government agencies on large-scale statistical sampling and testing programs. The work in the social sciences includes assistance in the preparation of questionnaires and sampling plans; development, application, and testing of new theory; writing instructions for use in the field, in the office, and for tabulation; computation of sampling errors; computation of costs; and actual experience in interviewing. Holders of internships in industrial statistics take part in the development of the necessary statistical theory and in experimental design, and have the opportunity of becoming familiar with actual testing practice and the development of new methods.

*Length:* Twelve or eighteen months; the length of time spent in the internship is determined by the training and experience of the applicant. The intern program is planned to conform, so far as practical, with the course program of the Graduate School so that beginning dates may be either September or February.

*Qualification:* Doctorate in mathematical statistics or completion of most of the course requirements, or

Doctorate, or completion of most of the course requirements, in an allied profession such as agriculture, economics, sociology, social psychology, engineering.

### Selection

Each application is reviewed and approved or rejected by the Committee on Internships in Sampling. The Committee helps the intern plan his program and consults with him from time to time concerning his progress. Where the intern program is being developed as a research project, serving as a basis for a doctoral dissertation, the Committee keeps the university informed of progress.

### Statement of Accomplishments

Upon satisfactory completion of his program, each intern is awarded a certified statement appropriately descriptive of the nature, extent, and quality of the training and work experience. In the case of pre-doctorate candidates, credit may be transferable under arrangements worked out in advance with the institution in which the intern is a candidate for a degree. In certain cases this work may be used, with the approval and cooperation of the degree-granting institution, as the doctoral thesis or as the basis for it. Where a student is interested in applying credit earned toward a degree or in using intern experience as a basis for a dissertation, arrangements with the institution which is to grant the degree should be completed prior to beginning the intern program.

### Stipends

The internships carry no stipends. The Graduate School makes and offers no living arrangements.

### Fees

The only fees charged are nominal course fees for those courses in which the intern is registered.

### Application

Address the application to the Director, Graduate School, Department of Agriculture, Washington 25, D. C., and include the following information:

- |   |   |
|---|---|
| (1) Name  | (5) Fields of specific interest and circumstances surrounding application (i.e., purpose, whether applicant would devote full time to internship, etc.) |
| (2) Date and place of birth                                 |   |
| (3) Transcripts of previous academic work                   |   |
| (4) Citations or copies of publications or technical papers |   |



Applications may be submitted at any time but should be submitted well in advance of the beginning of the fall and spring semesters, in September and February, to insure adequate arrangement of work schedules and course programs.

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## MATHEMATICS

### 1. Review of Freshman Mathematics

Summer, non-credit

SIDNEY KAPLAN

A review course on the level of freshman mathematics. Algebra, trigonometry, analytic geometry. A brief introduction to the methods of the differential calculus. Emphasis on applications to statistical problems. *Prerequisite*: One year of college mathematics.

### 2. Review of Calculus

Fall, non-credit. Repeated in Summer

H. BURKE HORTON

Variables, functions, limits, divided differences, derivatives, application of derivatives to geometry, engineering curve fitting and analysis. Transcendental functions, polar equations, differentials, mean value theorem, techniques of integration and engineering application. Series and expansion of functions. *Prerequisite*: Calculus.

### 102. Algebra

Fall, 3 credits. Repeated in Summer

JOSEPH S. RHODES

Fundamental rules of algebra; exponents; logarithms; manipulations with proportions; identities and conditions; solution of equations; binomial theorem; numerical approximations. Uses of symbolic operators. Determinants; solution of equations by the reciprocal matrix. Theory of equations; progression; series. Permutations and combinations. Graphical methods. Emphasis on applications to statistics and the physical sciences. *Prerequisite*: High school algebra and plane and solid geometry.

### 104. Trigonometry

Spring, 2 credits

JOSEPH S. RHODES

Basic definitions and uses of trigonometric functions; logarithmic solutions; radian measure; fundamental identities; oblique triangles; polar coordinates, inverse trigonometric functions; complex numbers and De Moivre's theorem; graphs of the functions and the inverse functions; introduction to spherical trigonometry. *Prerequisite*: College algebra.

### 105. Analytic Geometry

Fall, 4 credits. Repeated in Spring

To be announced

Planned for students majoring in engineering. Coordinates, locus problems, the straight line and circle, graphs, transformation of coordinates, conic sections, parametric equations, solid analytic geometry, curve fitting. *Prerequisite*: College algebra and trigonometry.

### 106. Analytic Geometry

Spring, 2 credits

JOSEPH S. RHODES

Fundamental concepts and formulas; line, circle, parabola, ellipse, hyperbola; transformation of coordinates; polar coordinates; parametric equations;

the second and higher degree equation in rectangular coordinates; graphic solution of equations; introduction to solid analytic geometry. *Prerequisite:* College algebra and trigonometry.

## 206. Calculus

Year, 4 credits each semester

THOMAS N. E. GREVILLE

First semester: Variables, functions, limits, continuity, derivatives. Applications of the derivative to geometry and physics. Maxima and minima. Differentials. Mean value theorem. Simple integration and applications to geometry and physics. Radius and circle of curvature. Vectors.

Second semester: Standard integral forms. Special methods of integration. Approximate integration. Improper integrals. Indeterminate forms. Taylor's formula with remainder. Infinite series. Partial derivatives. Multiple integrals. *Prerequisite:* Algebra, trigonometry and geometry.

## 305. Mathematics for Economists

Year, 2 credits each semester (alternate years)

J. E. MORTON

Introduces the student to the concepts of model building and to the use of mathematical tools for the measurement of non-stochastic and stochastic economic relationships. Topics, presented from the point of view of application to economic analysis, include: review of logarithms; interpolation; functions and graphs; curve fitting; differential and integral calculus through expansions of functions of two or more variables; elements of matrix notation and operations. *Prerequisite:* College algebra and a course in economic theory.

## 307. Unified Mathematics

Spring, 3 credits (every third year)

MURRAY A. GEISLER

A course covering the ideas and methods of modern mathematics, designed for students who wish to unify their mathematical training. Subjects treated consist of the theory of numbers, the number system, geometrical constructions, projective geometry, topology, functions, and limits. Emphasis will be placed upon the content and purpose of mathematical learning by appropriate illustrations from various fields. Text: Courant and Robbins, *What Is Mathematics?* (Oxford, 1941). *Prerequisite:* Calculus, or consent of the instructor.

## 420. History of Mathematics

Year, 2 credits each semester \*

DANIEL M. DRIBIN

The history of mathematics and the development of mathematical thought.

First semester: Mathematics from earliest times to the end of the seventeenth century.

Second semester: Mathematics from the time of Newton and Leibniz. Various mathematical theories will be surveyed, including the nature of modern mathematics. *Prerequisite:* Calculus.

\* Students may attend both semesters or either semester.

## [500.] Advanced Calculus (1953-54 and every third year)

Year, 2 credits each semester

JOSEPH H. KUSNER

## [502.] Differential Equations (1952-53 and every third year)

Year, 2 credits each semester

RICHARD K. COOK

## [610.] Introduction to Nonlinear Mechanics (1952-53 and alternate years)

Year, 2 credits each semester

OTIS E. LANCASTER

**[706.] Analytical Mechanics** (1953-54 and every third year)

Year, 2 credits each semester

RICHARD K. COOK

**[709.] Theory of Infinite Processes** (1952-53 and every third year)

Year, 2 credits each semester

JOSEPH H. KUSNER

**712. Theory of Functions**

Year, 2 credits each semester (every third year)

JOSEPH H. KUSNER

Calculus will be reviewed as necessary. Complex numbers, mapping. Branches and singularities; poles and zeros. Theory of limits; sequences. Convergence; uniform convergence. Line, surface, and volume integrals. Expansion by residues. Taylor's and Laurent's series. Fourier series. Analytical continuation. Bernoulli numbers. Euler numbers. Gamma and Beta functions. Riemann surfaces. Asymptotic expansions. Summability. The hypergeometric equation. Elliptic functions. *Prerequisite:* Calculus.

**715. Applications in Engineering Mathematics**

Year, 2 credits each semester (every third year)

RICHARD K. COOK

Graded problems in engineering used to illustrate fundamental mathematical techniques and methods of reducing physical statements to mathematical form. Exact and approximate methods of solving the resulting mathematical equations. The mathematical treatment will include calculus, series, differential equations, difference equations, Fourier series and integrals, and other devices. Text: von Karman and Biot, *Mathematical Methods in Engineering*. *Prerequisite:* A degree in engineering.

**STATISTICS**

*Elementary Courses*

**126. Introductory Statistics**

Year, 2 credits each semester. Repeated in Spring

HARALD C. LARSEN

C. M. PURVES

OTTO RAUCHSCHWALBE

The collection of data. The presentation of data in tables and charts. Different kinds of averages. Dispersion. Introduction to index numbers. Relations between two or more variables. Introduction to correlation theory, regression, and interpretation of samples. Practice in calculations. *Prerequisite:* High school algebra and geometry.

**136. Graphic Methods of Presenting Statistics**

Spring, 2 credits

R. G. HAINSWORTH

Analysis of statistical data to determine what form is best for graphic presentation. Application of data to the many types of illustrations in several forms of the various classes. Rough pencil layout examples of time series charts, frequency diagrams, graphic correlation charts, pictorial symbol charts, cartograms and other illustrative examples will be prepared in class. Comparability and evaluation of individual charts and maps in a series will be analyzed. *Prerequisite:* An introductory course in statistics, Elements of Statistical Drafting, or experience approved by the instructor.

**318. Machine Tabulation**

Fall, 2 credits. Repeated in Spring

MILTON KAUFMAN

The punch-card method. Functions of the principal types of tabulating machines. Operations of the machines are demonstrated. The instruction covers basic wiring of all types of commercial tabulating equipment. *Prerequisite:* General knowledge of tabulating equipment.

**319. Advanced Application of Tabulating Equipment**

Spring, 2 credits

MILTON KAUFMAN

The solution of advanced problems in the application of card-tabulating equipment, including the wiring of principal machines involved. *Prerequisite:* A course in machine tabulation and knowledge of the basic wiring of tabulating equipment.

**340. Introduction to Experimental Statistics**

Year, 2 credits each semester

WALTER A. HENDRICKS

A non-mathematical course in the analysis and interpretation of data from agricultural and biological experiments. Elementary probability relationships; binomial, Poisson, and normal frequency distributions; the concept of sampling error; tests of significance of differences between averages; the chi-square test as applied to differences between observed and expected frequencies; regression and correlation; and elementary discussions of analysis of variance and covariance. Numerical examples. Text: Snedecor, Statistical Methods. *Prerequisite:* College training in agriculture or a biological science; familiarity with ordinary methods of tabulating experimental data, computation of averages and the preparation of graphs.

**380. Principles of Statistical Analysis**

Year, 3 credits each semester

B. RALPH STAUBER

The purpose of the course is to lay a thorough foundation of the basic concepts and principles of statistical analysis as a method of scientific investigation.

Specifically, the course includes statistical terminology; elementary probability; the binomial, Poisson, and normal distributions; statistical tests of significance; simple and multiple correlation; some theory of determinants with applications to correlation and the inverse matrix; introduction to analysis of variance; introduction to sampling; elementary principles of design and analysis of surveys and experiments; use of statistical tables such as Fisher, Yates, and others. *Prerequisite:* College algebra, plane trigonometry, and analytic geometry; an elementary course in statistics is desirable.

*Advanced Courses***400. Introduction to Mathematical Statistics**

Year, 3 credits each semester

BENJAMIN J. TEPPING

A foundation course designed to give the student a broad introduction to modern mathematical statistics, after which he may specialize in application and do further work in mathematical statistics either for an advanced degree or a certified statement of accomplishment. General properties of sampling-distributions, with special studies of the binomial, hypergeometric, Poisson, multinomial, and normal distributions. Joint distributions of several variables. Moment generating functions. Distributions of chi-square, Student's *t*, Fisher's *z*, Snedecor's *F*, and the sample range. Distribution-free methods. Tests of statistical hypotheses. Estimation; bias, consistency, efficiency. Discriminant functions. Design of samples and experiments. *Prerequisite:* Calculus and Principles of Statistical Analysis or equivalent.



## 708. Linear Algebra

Fall, 3 credits (alternate years)

JOSEPH F. DALY

Determinants. Theory of linear dependence. Linear equations, homogeneous and nonhomogeneous. Matrix algebra; calculation of the inverse matrix; application to linear equations. Linear transformations. Quadratic forms; the matrix and discriminant. Reduction of a quadratic form to a sum of squares. The characteristic equation; definite and indefinite forms. Pairs of quadratic forms, reduction to normal form. Properties of polynomials. Invariants, covariants, half-invariants, and annihilators. Canonical formation of binary cubicals and quadratics. Symmetric functions. Elementary divisors. *Prerequisite:* Calculus.

## 710. Application of Linear Regression

Spring, 3 credits

JOSEPH F. DALY

Designed to give the student an understanding of how standard multiple regression analysis is related to curve fitting by least squares and to the analysis of variance and covariance. Topics discussed include: orthogonal polynomials, conditional distributions in the normal multivariate case, maximum likelihood and least squares estimation, non-orthogonal experimental designs, sampling distributions of regression coefficients, and the power functions of various analysis of variance tests. *Prerequisite:* Linear Algebra or equivalent.

## 735. Theory of Sample Surveys

Year, 2 credits each semester

MORRIS H. HANSEN, WILLIAM N. HURWITZ  
and JOSEPH STEINBERG

History of sampling in social surveys. The use of statistical control in improving the quality and efficiency of the estimates. Calculation of sampling errors. Random, stratified random, purposive, double and systematic sampling. Cost function, choice of sampling unit; size and type of sample necessary to attain a stated degree of precision, and the distinction between precision and accuracy. The theory of probability is developed as necessary. The contributions of Fisher, Neyman, Yates, Cochran, and others are studied. *Prerequisite:* Principles of Statistical Analysis and Calculus.

### [741.] Theory and Application of the Characteristic Function (1952-53 and every third year)

Year, 2 credits each semester

WALTER JACOBS

### [748.] Introduction to Mathematical Analysis (1952-53 and every third year)

Fall, 3 credits

MURRAY A. GEISLER

### [751.] Theory of Measure (1952-53 and every third year)

Spring, 3 credits

MURRAY A. GEISLER

### [752.] Advanced Theory of Probability (1953-54 and every third year)

Year, 3 credits each semester

MURRAY A. GEISLER



### *Applied Courses*

#### **025. The Federal Statistical System—Seminar**

Fall, non-credit

HARRY ALPERT

The Federal statistical system: its growth, organization, major characteristics and functions. Review and critical analysis of the "Hoover Commission" Task Force Report on the Statistical Agencies of the Federal Government.

A series of four lecture-seminars meeting at 3:30–5:00 P.M. on October 3, October 17, October 31 and November 14. No registration required; no fees charged.

#### **25. Operation of Automatic Calculators**

Spring, non-credit

EMMA F. DIEHL

A course designed to familiarize the student with the operation of calculating machines in common use. Techniques to be used for specific situations will be demonstrated by instructor and applied by student in examples for computation. Methods studied will be those of most use in statistical work including: addition, subtraction, multiplication and division, as well as combinations of these operations and arrangement of work in general statistical problems.

#### **435. Sampling in Social and Economic Surveys**

Fall, 3 credits

HAROLD NISSELSON

Non-mathematical survey of sampling theory and practice. Development of the basic ideas of statistical sampling, with applications in social and economic surveys. Unrestricted random, stratified, systematic, area and cluster sampling, and subsampling. Sample designs used in the United States and in foreign countries are discussed with respect to considerations of statistical efficiency, cost functions, and the administrative limitations imposed on the design. *Prerequisite:* A course in elementary statistics.

#### **436. Questionnaire Construction and Interviewing**

Fall, 2 credits

J. STEVENS STOCK and JOSEPH HOCHSTIM

Techniques for data collection in sample and census surveys: defining the issues; constructing dummy tables; the pretest questionnaire; pretesting methods; trial and experimental runs; question types; probes; Guttman and Thurstone Scales; other scaling methods; mathematical models; psychological models; loading stimulus and response; behavioristic methods; projective techniques; depth interviewing; interviewing practices; training interviewers; establishing rapport; refusals and substitutions; calibrating methods; interviewer variance; recall vs. diary. *Prerequisite:* Principles of Statistical Analysis or equivalent, and a background in the social sciences.

#### **437. Market and Opinion Research**

Spring, 2 credits

J. STEVENS STOCK and JOSEPH HOCHSTIM

Practices of commercial and government research agencies; client relations; structuring the problem; uses of secondary factual data; defining the universe; potential and existing market concentric construction; publics; sampling; questionnaire construction; experimental designs; panels; interviewing and observational techniques; analysis of results; development of sales and marketing policy; propaganda and advertising themes; media; specialties of existing commercial and government agencies. *Prerequisite:* Principles of Statistical Analysis or equivalent, and a background in the social sciences.

**480. Statistical Methods and Experimental Design**

Fall, 12 credits. Repeated in Spring ROY A. CHAPMAN and AUSTIN A. HASEL

Application of statistical methods to research work in the Forest Service stressing the logic of experimentation and the techniques of design, analysis, and interpretation of experiments or surveys. Emphasis is placed on: testing hypotheses in forest research; distribution of sample statistics; tests of significance.

Registration limited to qualified research personnel of the Forest Service.

**[507.] Statistical Methods in Engineering and Industrial Production (1952-53 and alternate years)**

Year, 2 credits each semester

W. R. PABST

**515. Publication of Statistical Reports**

Fall, 2 credits (alternate years) MORRIS B. ULLMAN and BRUCE L. JENKINSON

Data and their description, tabular presentation, statistical practices involved in data presentation, use of graphics, programing, and evaluation of existing statistical reports. *Prerequisite:* A course in elementary statistics.

**[520.] Government Statistics (1952-53 and alternate years)**

Year, 2 credits each semester

MORRIS B. ULLMAN

**[532.] Survey of Linear Programing (1952-53 and alternate years)**

Year, 2 credits each semester

GEORGE B. DANTZIG

**[535.] Statistics of Bio-Assay (1952-53 and alternate years)**

Fall, 2 credits

JEROME CORNFELD and JACOB E. LIEBERMAN

**[548.] Statistical Analysis of Economic Relationships (1952-53 and alternate years)**

Year, 2 credits each semester

RICHARD O. BEEN

**560. Theory of Electronic Digital Computing Machines**

Fall, 2 credits

EDWARD W. CANNON

Mathematical requirements for electronic digital computers. Alternative methods of sequencing automatic computers—instruction codes. Electronic computer systems and components—internal memory, control, arithmetic unit, input-output devices. Performance characteristics of electronic computers; analysis of errors. Preparation of problems for machine solution. *Prerequisite:* A bachelor's degree with major in engineering, mathematics, statistics, or physics and Principles of Statistical Analysis or equivalent.

**570. Design of Experiments in Biological Sciences**

Year, 2 credits each semester

D. D. MASON and SPECIALISTS

Principles of experimental design as applied to planning and analysis of plant and animal experiments. Problems in determining size of experiments, and selection of appropriate designs to meet objectives. Randomized block, latin squares, split plot, and incomplete block designs; their characteristics, uses, and analysis will be considered. Experimental and sampling errors, components of error, factorial arrangements, confounding, use of individual degrees of freedom and regression in analysis of variance will be studied in lecture and assigned

problems. *Prerequisite:* A course in experimental statistics or familiarity with meaning and method of calculation of standard errors, correlation, regression and analysis of variance.

### **571. Design and Interpretation of Experiments in Physical Sciences**

Fall, 2 credits (alternate years)

W. J. YODEN

An introductory course concerned with setting forth (a) the characteristics of a good experiment, (b) experimental designs and the associated statistical techniques for analyzing the data, and (c) methods for improving the precision of experiments. The topics will be illustrated by examples. *Prerequisite:* A degree in one of the sciences and Principles of Statistical Analysis or equivalent, or consent of the instructor.

### **[572.] Experimental Design in Physical Sciences—Seminar (1952–53 and alternate years)**

Fall, 2 credits

W. J. YODEN

### **575. Design of Social Inquiry**

Fall, 2 credits

LEON PRITZKER

Deals with the foundations of social inquiry and with some persistent problems in the execution of social surveys and experiments. Topics covered are the logic of model construction, the logic of experimental inference, and the translation of the research design into a set of operational specifications. Problems considered are the role of value judgments, communicating with the users and producers of the research, and determining the scope of the inquiry. *Prerequisite:* A degree in one of the social sciences and training in statistical analysis.

### **[753.] Recent Developments of Statistical Concepts (1952–53 and every fourth year)**

MORRIS B. ULLMAN and SPECIAL LECTURERS

### **448. Population Statistics I: Basic Sources and Methods\* (See p. 88)**

### **449. Population Statistics II: Intermediate Methods and Applications\* (See p. 88)**

### **700. Populations Statistics III: Advanced Analytical Methods\* (See p. 89)**

\* Presented jointly with the Department of Social Sciences.

# Office Techniques and Operations

## DEPARTMENTAL COMMITTEE

HENRY A. DONOVAN (Chairman)

VIRGIL L. COUCH

ROBERT H. FUCHS

JAMES E. HALLIGAN (Vice-chairman)

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WILLIAM P. KRAMER

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WILLIAM L. MOORE

ARTHUR B. THATCHER

## CLERICAL-ADMINISTRATIVE PROCEDURES

The courses described under Clerical-Administrative Procedures are closely related to those offered in the Department of Public Administration and are an integral part of the program leading to the Certified Statement of Accomplishment in Administrative Procedures. They are practical, how-to-do-it, courses chiefly of interest to persons in grade GS-7 positions, or below, who are either working with these procedures, or who hope to train themselves for such positions, or positions requiring some familiarity with more than one of these procedural subjects (e.g., administrative assistants and head clerks). High school graduation is a basic requirement for admission to these courses; exception will be made only on the basis of proven equivalent experience.

## CERTIFIED STATEMENT OF ACCOMPLISHMENT IN ADMINISTRATIVE PROCEDURES

The program leading to a Certified Statement of Accomplishment in Administrative Procedures should be of special interest to:

1. Persons already employed in administrative work of the procedural type, emphasizing techniques and skills.
2. Employees who aspire to enter administrative work but who, because of lack of college education, find their opportunities in that field greatly limited except at the procedural level. This program of courses is useful for persons with good native ability but limited educational background, because it prepares them for a level of work most likely to be open to them. After they have succeeded in getting into administrative work, perhaps even at the clerical-administrative level, they can then combine their work-experience and study-experience to mutual advantage as progress is made toward greater responsibility. This approach is believed to be better for such persons than the common practice of attempting to circumvent the usual educational requirements by shortcut concentration on advanced and specialized courses, which are



actually preparatory for responsible positions only insofar as they *supplement* broader educational background.

3. Employees who wish to prepare to become administrative assistants or to head units concerned with administrative procedures.

### *Requirements*

1. High school diploma or equivalent.
2. Sixteen semester hours of credit selected from the following Graduate School courses:
  - a. A course in American National Government.
  - b. A minimum of eight credits (in addition to *a* above) selected from courses above the 200 level in Clerical-Administrative Procedures, or from courses offered in the Department of Public Administration (excluding all accounting courses except Federal Government Accounting) or a combination of these.
  - c. The remaining credits may be selected from courses, not included above, in the Department of Office Techniques and Operations, excluding all shorthand courses.
  - d. A course in elementary statistics may be included. It is not required. If it is included, three credits may be deducted from *c* above.

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## CLERICAL-ADMINISTRATIVE PROCEDURES

### 101. Business Mathematics

Fall, 2 credits. Repeated in Spring and Summer

RALPH R. BOTTS  
LEONARD H. RHODES

Designed for clerical workers who are called upon to apply fundamentals of arithmetic to their jobs. Emphasis will be placed on review of business arithmetic including fractions, ratios, proportion, percentages, common divisors and multiples, progressions and elementary graphs and statistics. Special applications will be made to business problems such as simple interest; simple, bank, cash and trade discount; profit and loss; sales turnover; equation of partial payments and accounts; commuting debts; compound interest; compound discount; and annuities. Use of calculating machine will be explained.

### 108. Administrative Procedure

Fall, 2 credits. Repeated in Spring and Summer

THOMAS J. HICKEY

Intended for persons who wish to become supervisors or administrative assistants or who are now serving in such capacity in a small organizational unit. Deals with the aspects of the day to day assignments for which these persons ordinarily are responsible, such as preparation of budget data for small organizational units; the proper establishment of authority and responsibility and organization structure; fundamentals of personnel administration; essential requirements for good supervision.



The second part of this course deals with the introduction to administrative planning, administrative procedures and management generally at the lowest organization level, including work reporting and work measurements, work processes and work control reports; relation of these studies to the budgetary and personnel needs of the unit; and the theory of staff versus operating jurisdiction over administrative planning.

### 110. Federal Auditing Procedure

Fall, 2 credits. Repeated in Spring and Summer

HAROLD J. SELINSKY

This intensive one-semester course is intended for those having no previous knowledge of the subject and is designed to furnish fundamental training for employees now in lower grades as clerks, typists, machine operators, etc., who intend to take the course on Advanced Federal Auditing Procedure or who have opportunities of eventually becoming auditors by serving apprenticeships. It covers explanations of, discussions on and practice work with the two most common types of Government vouchers; deals with, to a limited extent, certain related documents and procedures and should prepare students for higher grades and better-paying positions.

Embraces general and basic principles; definitions of terms, description and use of standard forms involved, authorizations and allocations; general procedure in auditing standard form 1034 vouchers; suspensions and disallowances, General Accounting Office exceptions and replies; purchase order procedure and its relation to auditing; tax exemption procedure and its effect upon auditing; general procedure in auditing standard form 1012 vouchers; authority for travel, emergency travel per diem allowances, method of computation; methods of travel, duty status and leave, application of statutes, regulations and Decisions of the Comptroller General; exigency statements, special correspondence; and practice audit work on standard form 1034 "purchase" vouchers and standard form 1012 "reimbursement" vouchers.

### 112. Federal Accounting Procedure

Fall, 3 credits. Repeated in Spring and Summer

JOHN L. TIERNEY

Designed particularly to train accounting clerks through instruction of employees now working in lower grades and to assist accounting clerks in present and prospective positions. It embraces explanation of, discussion on, and practice work with the basic ledgers (allotment ledger, objective classification ledger, and general ledger) maintained in connection with funds made available to Federal agencies. Appropriation, apportionment, allotment, disbursement, collection, and reporting processes will be discussed and the relationship between administrative accounts and accounts kept by the Treasury Department and the General Accounting Office explained.

### 113. Federal Property Procedure

Fall, 2 credits

PERCY M. LUM and TONY M. BALDAUF

An elementary course covering principles and procedures in the utilization, accountability, and disposal of Federal personal property. Designed to furnish persons currently employed in this field an opportunity to learn the mechanics of their day-to-day jobs through a short intensive study of the prescribed policies and regulations and accepted practices. Acquaints the student with the essential operations in connection with: property inventorying; accountability records and controls; borrowing and loaning; lost, damaged, or destroyed property; development and application of equipment utilization and replacement standards; transfers and disposals; sales; donations; destruction or abandonment; determination of requirements; management through inventory controls; nomenclature; and statistical reporting of motor vehicle operation.

**114. Federal Personnel Procedure**

Fall, 2 credits. Repeated in Spring and Summer

VERNA C. MOHAGEN

Deals with the elementary principles and procedures of Federal personnel administration, including a study of the Federal personnel structure and organization, history and progress of the merit system, rules and regulations of the Civil Service Commission, and other basic procedural sources; use of personnel forms and records; Civil Service examinations and recruitment; appointments; transfers; promotions; separations and reductions in force; suspensions and disciplinary actions; retirement; performance ratings; leave and hours of duty; personnel reports, applications of Decisions of the Comptroller General, administrative policy statements, and administrative orders.

**115. Federal Purchasing Procedure**

Year, 2 credits each semester

JAMES SCAMMAHORN

This course is designed to assist employees, who are engaged in purchasing work or wish to get into it, in learning the detailed requirements of laws, regulations, and procedures applicable to procurement from Federal sources of supply and purchasing or contracting for supplies and services in the open market; the practical application of such requirements through the preparation of procurement and related documents covering the more common types of transactions; and solution of problems pertaining thereto. The fall semester is devoted to those phases having general application to purchasing and contracting but more specifically to procurement from Federal sources of supply and purchasing not requiring the solicitation and acceptance of bids.

The spring semester is devoted to acquiring knowledge of basic laws, regulations, and procedures needed in making the simpler contracts arising from competitive bidding or negotiation, with special attention given to the latter as authorized by the Federal Property and Administrative Services Act of 1949.

**116. Federal Budgetary Procedure**

Fall, 2 credits. Repeated in Spring

JESSE B. MCWHORTER

ERNEST L. STRUTTMANN

This course is designed to assist employees either in budget work or preparatory to taking budget work, up to and including Grade GS-9. It deals with budgetary procedures, including the preparation of estimates, justifications, tabular statements, graphs, etc., and, in connection with budget execution, outlines methods in making allotments, preparation of apportionment and obligation reports, and other methods used in the formulation and execution of the Federal budget.

**117. Records Management Procedure**

Fall, 2 credits

DOROTHY M. LUTTRELL and ROBERT H. LANDO

A course of instruction in how to process, maintain and service records, designed for students who desire to enter the records management field or who are interested in supplementing their knowledge of the mechanics and techniques of record operations. Includes detailed instructions in methods of (1) recording and controlling communications, (2) classifying, coding and indexing correspondence and other record material, (3) filing records and references, and (4) furnishing records reference service, including the establishment and operation of charge-out and follow-up systems. This course also provides study and discussion of (1) the theory and structure of the various systems of classification and filing, (2) the selection of the proper systems of classification for individual requirements, and (3) the development of individual classification and filing patterns.

**201. Supervision**

Fall, 2 credits. Repeated in Spring and Summer

EARL D. SHARAR

A course for persons who have or expect to have first-line supervisory responsibilities. Particular emphasis will be placed upon the need for understand-

ing human behavior and attitudes as they manifest themselves in group efforts. The dynamic setting in which supervisory responsibilities are discharged, its importance to management, the individual qualities and specific techniques employed by supervisors to improve work methods will be considered, and a program of self-development and self-evaluation in the art of supervision suggested.

## 208. Advanced Administrative Procedure

Fall, 2 credits. Repeated in Spring

M. HARVEY SHERMAN

Intended for persons who are now assigned to administrative assistant and supervisory positions. Deals with (1) the conduct of administrative and procedural surveys and audits directed toward the development of factual data for management purposes; the analysis of these data, the preparation of reports and recommendations thereon; (2) the putting into effect of the approved recommendations through the actual drafting of procedural instructions and the designing and standardization of forms; (3) the installation of approved procedures and the establishment of executive controls to insure compliance with approved instructions; (4) the modern and tested techniques and methods ordinarily used in developing factual data and graphic presentations regarding flow of work, organization structure, work assignments, authority, work duplications, delays and bottlenecks; (5) report writing; (6) the value of illustrated presentations of work processes in eliminating duplication of work, in simplifying operations and in cutting out unnecessary steps; (7) the value of and the need for specific written manuals of instructions as tools of management; and (8) the relation of these instructions to those taught in the other Office Techniques and Operations Courses. *Prerequisite:* Completion of one of the following courses in Office Techniques and Operations: 108, 110, 112, 113, 114, 114, 116, 117, 201; or Course 344, Introduction to Public Administration.

## 210. Advanced Federal Auditing Procedure

Spring, 2 credits

EMMETT B. COLLINS

Includes explanations of and discussion on Federal auditing policy and practice along advanced lines. Covers the relationship of auditing to general fiscal control; administrative examination of fiscal documents; application of legislation and regulations; use of Comptroller General Decisions; relation of Comptroller General's Decisions to particular cases; normal methods of handling suspensions, disallowances, certifications, etc.; unusual problems in the audit of standard form 1034 vouchers and 1012 vouchers; relationship of procurement to auditing and the policies followed in the use of purchase orders; authority for travel and policies relating thereto; per diem allowances and computations, and policies respecting rates; transportation of property and personnel, use of transportation requests and bills of lading; audit of transportation vouchers; audit of payrolls and application of payroll procedures; General Accounting Office exceptions and preparation of replies; claims, adjustments and direct settlements. This advanced course in Federal Auditing Procedure is designed to assist auditors to prepare themselves for more responsible and more remunerative positions. *Prerequisite:* Federal Auditing Procedure or equivalent experience.

## 214. Advanced Federal Personnel Procedure

Fall, 2 credits. Repeated in Spring

EUGENE J. PETERSON

Similar to Federal Personnel Procedure but more intensive in its treatment of certain phases of the subject. Deals with advanced principles and techniques in Federal personnel procedures and their relation to operating programs, including a study of the principles of the Civil Service Act, Rules and Regulations, and their application to day-to-day problems in a Federal personnel office; recruiting sources for Civil Service examinations and appointments; study of promotion-from-within procedures; reduction-in-force procedures, and their application to specific operating situations; study of procedures for systematic retirement



of employees reaching annuity age; procedures for investigation and enforcement of discipline; periodic reports and their use for operating purposes; procedure and policy statements in the general field of personnel administration; procedural source materials such as the Civil Service Commission, Federal Personnel Manual, Decisions of the Comptroller General, Executive Orders, etc., and applying them to detailed operating procedures; relationship of the personnel office to budget, accounting, payrolling, and other staff functions. *Prerequisite:* Federal Personnel Procedure or equivalent practical experience in a Federal personnel office at Grade GS-4 or above.

### 217. Advanced Records Management

Spring, 2 credits

DOROTHY M. LUTTRELL and ROBERT H. LANDO

Designed to give the student a comprehensive knowledge of the management of Government records. Includes a detailed study of the requirements of the Federal Records Law and action necessary for meeting the requirements of this law; the application of management techniques to the creation, maintenance, utilization, preservation and disposition of records. Also includes a discussion of laws and regulations governing the preservation and disposal of records, appraisal, systematic retirement, storage, disposal and microphotography; the development and application of records retention and disposal standards. *Prerequisite:* Records Management Procedure or consent of instructor.

### 413. Office Management

Fall, 2 credits. Repeated in Spring

DANIEL M. BRAUM

Designed to give supervisors and administrative assistants familiarity with the fundamental principles and methods needed by them to do a satisfactory management or supervisory job. Deals with the common day to day administrative problems and questions encountered by supervisors such as, (1) determination of space requirements and proper space allocation with due regard to flow of work; (2) the utilization and care of all existing facilities—equipment, labor saving devices, communications, etc.; (3) discussion of the effect of heat, light and ventilation on the morale and output of employees; (4) development and use of management tools in the Federal Government; (5) planning for improvements—how to secure participation by officials, supervisors and employees in suggesting and making improvements; and (6) a treatment of many management aides and devices not specifically covered in other Graduate School courses.

## GOVERNMENT LETTER, REPORT, AND PROCEDURAL WRITING

### 120. Government Letter Writing

Fall, 2 credits. Repeated in Spring and Summer

VERNE L. SAMSON

The writing of clear, accurate, concise, courteous letters and memoranda contributes to efficiency and economy in administration. This course gives the student (1) opportunity to work out the principles of effective letter writing; (2) practice in criticizing and revising outgoing correspondence, and in planning and drafting replies to incoming letters; and (3) drill in the fundamentals of good writing.

### 420. Procedure Systems and Methods of Developing Instructions

Fall, 2 credits,

TEN M. F. ALLSMAN, RUSSELL HESS and SARAH L. AMES

A study of (1) various types of procedure or directives systems, (2) kinds of individual issuances, and (3) methods used in developing and writing instructions and procedures. Special attention will be given to the various types of survey methods and when to use them. The course will cover all steps in de-

veloping a procedure from the time of initial planning through the revision of installed procedures. Technical procedure functions (such as codifying and indexing), development of standards for editing and format, and types of visual presentations will be included. The purpose of the course is to provide a technical background for evaluating various procedure systems and methods for those students who will write procedures.

## **421. Writing Procedures and Instructions**

Spring, 2 credits

TEN M. F. ALLSMAN and KAY PEARSON

A course of instruction in how to develop and write manual issuances, circulars, office memoranda, and other forms of rules, regulations, instructions, and procedures. Special attention will be given to ways of improving readability of such material, the use of a clear, simple style of writing, proper format, and use of "ready-reference" aids. It will provide drill in the practical application of principles and theories of procedure to actual writing. The purpose of the course is to provide students with group experience in writing procedures and instructions and in applying editorial and format standards. *Prerequisite:* Procedure Systems and Methods of Developing Instructions or one year of experience in writing procedures at Grade GS-5 or above.

## **422. Systems for Reports and Forms Management**

Fall, 2 credits

TEN M. F. ALLSMAN and HARRY M. BELL, JR.

Designed to provide students with a comprehensive knowledge of forms and reports management systems and how to operate them. A study of: various systems used for controlling forms and reports; different techniques used in Government for forms design and format; standards and printing specifications; methods for analyzing forms and reports; and how to install and operate forms and reports management programs. Analysis of forms and reports by case studies with group discussion of techniques involved. Special lectures by top technicians from representative Government departments.

## **SHORTHAND**

These courses are designed to furnish Federal employees an opportunity to follow a program of training for stenographic careers in the Federal service. While each course represents a separate unit of study, with emphasis on material used in the Federal service, a proper sequence of courses insures a sound foundation for successfully qualifying for the various grades and classifications of stenographers in the Federal service.

"Review of Gregg (Anniversary)" will serve as rapid review for the student who has not applied his shorthand knowledge for a long time, or has used it so little that he feels uncertain about applying his knowledge to practical office dictation. Students wishing a review of Gregg Simplified should enroll in "Gregg, 60 to 80 Words."

"Gregg, 100 to 130 Words" is an intensive course on technical material. Students should have a sound foundation in theory and be able to write 100 words a minute with a 95 percent accurate transcript before registering for the course.

The two courses in Reporting Shorthand are open to stenotypists as well as Gregg writers.



Home study is required in all the courses to attain goals set in course descriptions. Amount of study required varies according to the learning habits and individual goals of students.

A prerequisite for all shorthand courses is the ability to type-write with a fair degree of accuracy and speed.

As a general guide to assist employees who wish to plan a course of study to build for a stenographic or stenographic-reporting career in the Federal service the following parallels are drawn:

<i>Course</i>	<i>Goal</i>	<i>Prerequisites</i>
Gregg Shorthand Simplified I	Ability to apply all the basic principles of Gregg Shorthand Simplified; mastery of all the brief forms; ability to read shorthand plates at a fairly rapid rate; ability to write legible outlines and to take dictation of new and practiced material.	For those who have not studied shorthand, or for those who have some knowledge of shorthand but have not completed basic theory.
Gregg Shorthand Simplified II	An increasing mastery of principles of Gregg Shorthand Simplified (by review and drill); ability to construct new shorthand outlines; ability to take dictation of new standard material at a minimum of 60 words a minute and to produce accurate transcripts.	For those who have completed Gregg Shorthand Simplified I or its equivalent.
Gregg Shorthand Simplified, 60 to 80 Words	Theory review; ability to take dictation at 80 words a minute for 5 minutes; ability to produce acceptable transcripts of letters and reports dictated at rates varying from 60 to 80 words a minute.	For those who have completed Shorthand I and II or equivalent theory and dictation courses and who have a minimum speed of 60 words a minute on new, standard material.
Gregg Shorthand, 80 to 100 Words	Ability to take dictation of new, standard material at 100 words a minute for 5 minutes; ability to produce, at a good rate of speed, accurate transcripts of letters, reports, conferences, and telephone conversations.	For those who have a minimum dictation speed of 80 words a minute using either the Simplified or Anniversary system and who are able to produce accurate transcripts of letters and reports.
Gregg Shorthand, 100 to 130 Words	Ability to take dictation of new, standard material at 130 words a minute for 5 minutes; ability to produce, at a good rate of speed, accurate transcripts of letters, reports, conferences, and telephone conversations.	For those who have a minimum dictation speed of 100 words a minute and who are able to produce accurate transcripts of letters and reports.

Introduction to Reporting—Gregg, 130 to 150 Words

Ability to record conferences and hearings 60 to 70 percent verbatim; introduction to reporting techniques.

For those who have qualified on 130-word a minute standard tests or their equivalent. Open to stenotypists.

Reporting—Gregg, 150 Words and Up

Ability to use high-speed short-cuts and advanced reporting methods; verbatim reporting of lectures, hearings, and conferences.

For those who have qualified on 150-word a minute standard test or the equivalent. Open to stenotypists.

## 89. Review of Gregg Shorthand (Anniversary)

Fall, non-credit. Repeated in Spring and Summer.

VIVIAN W. FLINCHUM

A review of theory and brief forms. Reading from shorthand plates and students' own notes; dictation of standard material at various progressive rates of speed. *Prerequisite:* Completion of the Gregg Manual or its equivalent by the Anniversary system.

## 129. Gregg Shorthand Simplified I

Fall, 3 credits. Repeated in Spring and Summer

KATHRINE WILKEY

## 130. Gregg Shorthand Simplified II

Fall, 3 credits. Repeated in Spring and Summer

KATHRINE WILKEY  
MARGARET O. HOBBS

## 225. Gregg Shorthand Simplified, 60 to 80 Words

Fall, 3 credits. Repeated in Spring and Summer

To be announced

## 226. Gregg Shorthand, 80 to 100 Words

Fall, 3 credits. Repeated in Spring and Summer

RALPH ROWLAND

## 231. Gregg Shorthand, 100 to 130 Words

Fall, 3 credits. Repeated in Spring

MARIAN I. HARLIN

## 335. Introduction to Reporting—Gregg, 130 to 150 Words

Fall, 4 credits. Repeated in Spring

JACK ROMAGNA

## 336. Reporting—Gregg, 150 Words and Up

Fall, 4 credits. Repeated in Spring

E. DONALD BELL

## SECRETARIAL PRACTICES

### 325. Secretarial Practices

Fall, 2 credits. Repeated in Spring

ELLEN S. GROFF

Training in the duties of the secretary. Use of supplies, forms, and available office services; letter writing problems; modern filing systems; responsibilities as personal and telephone receptionist; personal qualities of the secretary; office organization and the place of the secretary in the organization.

## Physical Sciences

### DEPARTMENTAL COMMITTEE

ELSA O. KEILES (Chairman)

LESLIE W. BALL

S. W. BOGGS

L. W. CURRIER

ARNOLD J. LEHMAN (Vice-chairman)

MARK L. NICHOLS

HENRY STEVENS

HARRY WEXLER

—O—

The courses in this department offer unusual opportunities for study under the guidance of scientists working in this field. The program will be of value to students who plan to enter these sciences; to those who desire to increase their knowledge of the science in which they now earn their living; and to those who wish, for cultural reasons, to learn more about these fields.

Some of the courses provide basic training together with the required laboratory work. Others, usually arranged as seminars, are designed to keep professional workers informed of recent developments in the field.

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## CHEMISTRY

### 100. General College Chemistry

Year, 4 credits each semester (alternate years)

ROBERT G. WILLIAMSON

This course presents the fundamental principles of chemistry and shows their applications to everyday life. It attempts to develop an understanding of scientific methods of problem solving and to develop scientific attitudes.

First semester: Chemical principles, the gas laws, the kinetic theory, atomic structure and the classification of the elements, valence, oxidation and reduction, the solid and liquid states, solutions, and ionization. The laboratory work consists of experiments which parallel the lectures.

Second semester: Chemical equilibrium, reaction rates, solubility product constants, hydrogen ion concentration, the colloidal state, catalysts, metals and their compounds. The laboratory work consists of a study of the qualitative analysis of the more common cations and anions.

The class meets in the Chemistry Laboratory of Wilson Teachers' College.

### 220. Crystal Chemistry

Fall, 3 credits

C. L. CRIST

Historical survey; the nature of the chemical bond; systematic crystal chemistry including the correlation of observed crystal structures with physical properties. Particular emphasis will be put on the structures of minerals. *Prerequisite:* A course in college chemistry and in college physics. A course in mineralogy is desirable.

### [248.] Organic Chemistry (1952-53 and alternate years)

Year, 4 credits each semester

ROBERT G. WILLIAMSON

### 312. Food Technology—Fruits and Vegetables

Spring, 2 credits

LOWRIE M. BEACHAM

Basic principles of the chemistry of fruits and vegetables with special reference to their preservation by canning, freezing, drying, etc., and with emphasis on the requirements of the Federal Food, Drug, and Cosmetic Act. Variety and stage of maturity as related to the provisions of applicable standards of identity, quality, fill of container, and other official grades. Chemical and physical methods of measuring maturity and quality factors. Permitted flavoring, seasoning, and stabilizing ingredients. Chemical preservatives. Desirable and undesirable changes resulting from preservative processes. Advantages and limitations of various methods of preservation. Choice of methods with various classes of material. *Prerequisite:* Inorganic chemistry; a course in organic chemistry is desirable.

### 315. Elementary Biochemistry

Year, 2 credits each semester (alternate years)

SIDNEY M. HESS

The first semester's material will cover pH, oxidation-reduction, the chemistry of carbohydrates, fats, proteins, and the fundamentals of enzyme chemistry. The second semester will deal with the digestion and absorption of food, intermediary metabolism, excretion, vitamins, and hormones. Lectures, discussion, and examinations. *Prerequisite:* Organic chemistry.

### 349. Physical Chemistry

Year, 2 credits each semester (alternate years)

RALPH ROBERTS

Lecture course on the fundamental laws of chemical reactions. Correlations between molecular structure and physical and chemical properties of matter are considered. The principles of thermodynamics, thermochemistry, chemical equilibrium, and chemical activation are discussed. Other topics include the phase rule, eutectic mixtures, and cooling curves; colloids; adsorption; solutions; ionization and electrolytic conductance; electrode potentials; speed of reactions; effects of radiation on chemical reactions; industrial distillation problems; isotopes; and radioactivity and transmutation of the elements. *Prerequisite:* One year general chemistry and calculus; or permission of the instructor.

### 400. Advanced Organic Chemistry

Year, 2 credits each semester

WILBUR I. PATTERSON

An advanced course in principles of organic chemistry. Reactions of the aliphatic, aromatic, carbocyclic and heterocyclic compounds will be considered. Newer developments will be presented, particularly methods for the determination of structure. *Prerequisite:* Organic chemistry.

### [522.] Advanced Biochemistry (1952-53 and alternate years)

Year, 2 credits each semester

SIDNEY M. HESS

### [545.] Alkaloids, Glucosides, and Toxins of Biological Importance (1952-53 and alternate years)

Spring, 2 credits

GEOFFREY WOODARD and SPECIALISTS

### 550. Pharmacology of Insecticides

Spring, 2 credits (alternate years)

ARNOLD J. LEHMAN and STAFF

Insecticides, rodenticides, fungicides, and insect repellents discussed with regard to identity, acute, chronic, and dermal toxicities, biochemistry, pharmacodynamics, and pathology. *Prerequisite:* Bachelor's degree or equivalent in biology or chemistry; knowledge of physiology desirable.



**625. Specialized Analytical Techniques**

Fall, 2 credits (alternate years)

GEOFFREY WOODARD and STAFF

Recent developments, applications, and future problems. Techniques include: visual, ultraviolet and infrared spectrophotometry; straight, partition, and paper chromatography; counter current distribution; micromanometric techniques; and use of purified enzymes as an analytical tool. Laboratory demonstrations. *Prerequisite:* Bachelor's degree or equivalent in the natural or physical sciences and responsible laboratory experience.

**[630.] Enzymatic Basis of the Pharmacological Action of Drugs (1952-53 and alternate years)**

Fall, 2 credits

CARTER D. JOHNSTON and STAFF

**GEOGRAPHY****[420.] Physiography of Eastern United States (1952-53 and alternate years)**

Fall, 2 credits

ESTHER J. ABERDEEN

**421. Physiography of Western United States**

Fall, 2 credits (alternate years)

ESTHER J. ABERDEEN

A survey of the physiographic provinces and sections of the United States lying west of the Central Lowland. The work of the course will involve lectures, informal discussions, reviews of significant papers, and map studies, with special emphasis on the geologic foundations of land forms. *Prerequisite:* Courses in physical and historical geology.

**GEOLOGY**

The following courses in geology are offered in cooperation with the United States Geological Survey and will be given in its well equipped laboratories. They are designed strictly for graduate students, and will enable employees to continue geologic studies while stationed in Washington. However, registration in these courses is not limited to employees of the Geological Survey.

The prerequisite for enrollment is a bachelor's degree in geology or the equivalent as an undergraduate major in geology from an acceptable institution; within this background, specific prerequisites are indicated under the course descriptions.

**435. Elements of Physical Geology**

Fall, 3 credits

To be announced

Minerals and rocks as constituents of the earth's crust; processes of weathering, erosion and deposition; vulcanism; structures of sedimentary and igneous rock formations; diastrophism; mountain building; land forms and their relation to various geologic processes; stability of the earth's crust. The courses include classroom exercises in the study of common minerals and rocks, and interpretation of topographic and geologic maps. *Prerequisite:* Inorganic Chemistry.



**[640.] Principles of Ore Deposition** (1952-53 and alternate years)

Fall, 3 credits

FRED M. CHACE and SPECIALISTS

**641. Advanced Dynamic Geology**

Spring, 3 credits (alternate years)

WILLIAM T. PECORA and SPECIALISTS

Includes constitution of the earth, origin and constitution of magma, isostasy and isostatic adjustment, mechanics and theories of deformation, seismic disturbances, and similar topics of a fundamental nature. *Prerequisite:* Bachelor's degree in Geology with courses in general and historical geology, structural geology, mineralogy and petrology.

**[642.] Advanced Structural Geology** (1952-53 and alternate years)

Spring, 3 credits

WILLIAM T. PECORA and SPECIALISTS

SOIL SCIENCES

**156. Soil Conservation**

Spring, 2 credits

J. GORDON STEELE

A practical course about soil conservation farming. Why we need to conserve soil. What happens to water on the land and in the soil. Changes in soils due to erosion, deposition, leaching, and depletion. Changes due to cropping and grazing, including changes in structure, permeability, and fertility. Long-time changes in soil development compared with short-time changes. Practices for maintaining soil and controlling runoff and erosion. Influence of soil, slope, and climate on capability of land for crops, grazing, woodland, and other uses. Selecting land uses and conservation practices that fit land capability and that fit together in a practical, basic farm or ranch conservation plan. The work of soil conservation districts.

**[405.] Soils—Their Origin and Geography** (1952-53 and alternate years)

Spring, 3 credits

CONSTANTIN C. NIKIFOROFF

**531. Soils: Their Morphology, Genesis, and Classification**

Spring, 3 credits

CONSTANTIN C. NIKIFOROFF

The nature of soils and the broad principles governing their behavior are first discussed, followed by consideration of soil morphology, formation, and classification. Particular attention is given to characteristics of the great soil groups and their genesis in relationship to the physical and biological forces of the environment. Soil geography of the United States is dealt with broadly, but some examples from other parts of the world are used. Throughout the course, relationships of soil characteristics to agricultural development, soil use and conservation, and patterns of human occupancy are emphasized. *Prerequisite:* Freshman chemistry or its equivalent. Previous training in soils, plant physiology, geography or geology is desirable.

**[560.] Soil Physics** (1952-53 and alternate years)

Fall, 2 credits

C. S. SLATER

## METALLURGY

**452. Principles of Physical Metallurgy**

Fall, 2 credits

BLAKE M. LORING

Development, meaning, and use of equilibrium diagrams for binary alloys. Iron-carbon diagrams and their relation to cast iron and steel, and to the critical points important in heat-treating ferrous alloys. Steel-treating processes depending on non-equilibrium conditions, including the TTT-Curve. Alloy steels. Aging and precipitation hardening. Segregation and other ingot defects. Mechanical and physical tests, including the interpretation of micrographs. Non-ferrous alloys of industrial importance. *Prerequisite:* College chemistry and physics.

**528. Principles of Engineering Alloys**

Spring, 2 credits

BLAKE M. LORING

Manufacture, heat treatment, and special characteristics determining usage and availability of plain carbon steel, special steels, and non-ferrous alloys such as aluminum, magnesium and titanium. *Prerequisite:* Degree in engineering.

## METEOROLOGY

**162. Principles of Meteorology**

Spring, 2 credits

WILLIAM H. HAGGARD

A non-technical course designed for persons interested in the general aspects of weather and for those concerned with the application of weather to their particular field of study.

The first part of the course includes weather instruments and observations, the properties, processes and general circulation of the atmosphere, storms, and climatic conditions of the United States. The use of daily maps and forecasts is discussed.

The second part is a survey of the effect of weather and climate on man and his activities, including agriculture, aviation, transportation, public utilities, business, industry, health and recreation.

**310. Methods in Climatology**

Fall, 2 credits

H. C. S. THOM

A study of modern climatological methods with emphasis on statistical analysis as applied to meteorological data. *Prerequisite:* A knowledge of elementary statistics.

**415. Applied Climatology**

Fall, 3 credits

WOODROW C. JACOBS

Course consists of a study of modern climatological methods as applied to the weather problems of business, industry and agriculture. A knowledge of the basic principles of meteorology is required but the essential statistical and climatological tools are developed within the course. Special problems are assigned in lieu of laboratory work. *Prerequisite:* A knowledge of elementary statistics is helpful but not required.

**[533.] Hydrology (1952-53 and alternate years)**

Year, 3 credits each semester

MAX A. KOHLER

**536. Physical and Synoptic Meteorology**

Year, 3 credits each semester (alternate years)

FREDERICK G. SHUMAN

A two-semester course in the fundamentals of modern meteorology for the professionally interested student. The first semester stresses the physical aspects—atmospheric composition and structure and their measurement; gas laws; adiabatic, pseudo-adiabatic, and non-adiabatic processes; thunderstorms; fog; wind. The second semester stresses synoptic features—general and local circulations, air masses, fronts, cyclones and anticyclones, upper-air charts, forecasting. Problems involving basic units and graphic manipulations will be assigned. *Prerequisite:* Physics and algebra; trigonometry and elementary meteorology desirable.

**[537.] Weather Analysis and Forecasting (1952–53 and alternate years)**

Year, 3 credits each semester

THOMAS I. GRAY, JR., and JAY S. WINSTON

**538. Elements of Dynamic and Synoptic Climatology**

Spring, 2 credits

WOODROW C. JACOBS

The methods of dynamic and synoptic meteorology are utilized to develop a theoretical global climatology. The causes of regional and seasonal variations in climate are emphasized. Climatological data are used only to verify theoretically derived climatic models. *Prerequisite:* Physical and Synoptic Meteorology or its equivalent, or consent of the instructor.

**580. Advanced Weather Analysis and Forecasting**

Year, 3 credits each semester (alternate years)

THOMAS I. GRAY, JR., and JAY S. WINSTON

Weather data not only for the North American area, but also for various other areas of the earth including the tropical and polar regions are analyzed. Important forecasting problems, such as cold waves, heat waves, heavy rain, snow and ice storms, widespread fog conditions, icing, hurricanes, and tornadoes are investigated. Specialized forecasting and information for various industries such as air transportation, shipping, agriculture, forestry, and sports are discussed. More detailed and experimental analysis of data is emphasized, including: study and use of isentropic charts, constant vorticity trajectories, vertical motion computation, jet stream analysis, frontal contour charts, and nephanalysis. Methods of extended period forecasting (as practiced by the U. S. Weather Bureau) are presented. *Prerequisite:* Weather Analysis and Forecasting or equivalent, or two years' experience in analysis and forecasting.

**OCEANOGRAPHY****360. General Oceanography**

Fall, 2 credits

RICHARD H. FLEMING

A descriptive lecture course covering the characteristics of the oceans and the factors that control the distribution of properties and of plants and animals. Includes the physics, chemistry, geology and biology of the oceans. *Prerequisite:* College courses in at least two of the physical or biological sciences.

**570. Introduction to Oceanography**

Spring, 2 credits

RICHARD H. FLEMING

A technical course designed for those whose work is related directly or indirectly to the sea. Methods of observation, analysis and presentation are de-

scribed. Assignments are made demonstrating the plotting, interpretation and application of data relating to the physics, chemistry, geology and biology of the oceans. No laboratory work. *Prerequisite:* Bachelor's degree in one of the physical or biological sciences or permission of the instructor.

## PHYSICS

### 153. College Physics

Year, 4 credits each semester (alternate years)

WILLIAM A. KILGORE

An introductory college course consisting of lectures, demonstrations, and individual laboratory work.

First semester: Mechanics, heat, and sound, with major emphasis upon the concepts of mechanics.

Second semester: Light, electricity, and electronics, with major emphasis upon electricity.

The class meets in the Physics Laboratory of Wilson Teachers College. *Prerequisite:* Two years high school mathematics and one year high school physics or equivalent.



# Public Administration

## DEPARTMENTAL COMMITTEE

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GLADYS L. BAKER

K. A. BUTLER

H. DEAN COCHRAN

PATTERSON FRENCH (Vice-chairman)

JOHN H. THURSTON

I. THOMAS MCKILLOP

WILLIAM A. MINOR

HARLOW S. PERSON

DON K. PRICE

## OPPORTUNITIES FOR STUDY AND WORK

The importance of public administration is apparent in the modern state with its emphasis on services, control, operation, and collective action in the public interest. The more the public service is called upon to assume functions previously exercised by individuals or private enterprise the greater the importance of the principles and techniques of public administration. Management problems raised by the war and its aftermath illustrate the critical need for more and better training in public administration, particularly in the junior and assistant positions, even in normal times. The increasing delegation of discretion to administrative agencies has raised unprecedented problems of organization, public consent, and administrative responsibility.

Washington is of necessity the national focal point of all these developments. Many of the ablest and most experienced public administrators are assembled in Washington. Many of the most competent practitioners of the various specialized branches of administration are likewise concentrated in Washington. Utilizing this unique environment and this unexcelled talent, the Graduate School offers courses geared to demonstrated needs and taught by experienced administrative personnel.

## SUGGESTIONS FOR PROGRAM OF STUDY

Courses in this Department cover a wide range of approaches for varying levels of responsibility. Some give background and attitude, and some give methods and skill. Some have their objectives high and broad for perspective and knowledge of relationships; some have their objectives comparatively narrow and sharply focused for skill and ability to perform particular tasks. It is hoped that students will select those courses which supplement and complement their work assignments rather than concentrate exclusively on more intensive training in the performance of daily tasks.

*Background Courses.* These courses provide a general foundation in American government and the fundamentals of public ad-

ministration. They give the student an understanding of the theory and structure of our government so that as a public servant he may better appreciate the master-servant relationship between citizens and government employees.

A student who plans to take work in any of the divisions of the department will find that the specialized courses have more meaning and usefulness if he has first completed these background courses or their equivalent.

*General Administration.* This group of courses brings together the scientific management developments of private industry and those of public enterprise into a basic and comprehensive program of general administration.

*Organization and Methods Analysis.* These courses are offered to afford students an opportunity for progressive study and advancement in the general field of organization and methods work (hereafter called O&M work).

The courses use to advantage, among other background data, the instructional and case materials developed by the Bureau of the Budget and by other Governmental agencies. A student progressing through these courses should develop a well balanced understanding of the principles, techniques, and administrative aspects of O&M work. The courses are designed for students with varying degrees of experience in this field.

Students interested in this area will find useful the scientific management courses under general administration; for scientific management as found in industry is, in part, translated and applied to Governmental operations.

*Financial and Budgetary Administration.* Students desiring a knowledge of how the Government obtains, budgets and manages its money will find helpful several of the background courses and some of the courses in general administration as well as the specialized courses in this division. Those with limited experience in this field will wish to begin their study with Federal Budgetary Procedure, in the Division of Office Techniques and Operations, and the background courses before attempting the advanced courses in Budget Formulation and Execution.

*Personnel Administration.* The student is urged to begin with the background courses in public administration before concentrating on the program in this division. Unless substantial experience can be substituted, the general course, Public Personnel Administration, should be taken before the specialized courses (such as Position Classification, Selection and Placement, etc.). Persons who are in positions classified at GS-5 or below and desire to prepare for personnel work should begin with Federal Personnel Procedure; they should not attempt to take the specialized courses until they have

gained substantial experience in personnel work or have carefully laid a foundation by completing all basic, general courses.

*Procurement and Property Management.* Courses in this area deal with how the Government purchases, manages and accounts for materials and supplies. Those interested in purchasing but with limited experience, will find it helpful to begin with the courses in Federal Purchasing Procedure and Federal Property Procedure before attempting the management courses.

Selected background courses in public administration together with courses in the Division of General Administration will provide a thorough training in administration in this area.

*Accounting and Auditing.* Students in classification grades below GS-5 will find it advantageous to begin with Federal Accounting Procedure or Federal Auditing Procedure. Preparation for higher-level accounting should begin with a year's study of Principles of Accounting, after the completion of which Federal Government Accounting may be taken. Intermediate Accounting, Cost Accounting, Auditing, Federal Tax Accounting, Advanced Accounting, and Analysis and Interpretation of Financial Statements provide advanced training for those who desire to progress further with a general accountancy program. (See p. 71 for Certified Statement of Accomplishment in Accounting.)

#### CERTIFIED STATEMENTS OF ACCOMPLISHMENT IN PUBLIC ADMINISTRATION

##### COMMITTEE

GLADYS L. BAKER (Chairman)

PATTERSON FRENCH

JOHN H. THURSTON

Certified Statements of Accomplishment are granted to undergraduate and to graduate students who have completed an organized course of study in public administration intended to provide basic training for responsible administrative work.

The programs leading to a Certified Statement of Accomplishment in Public Administration should be of special interest to:

1. Persons already employed in responsible administrative positions. Included in this group are many with specialized training who have been transferred to administrative positions from professional positions without training or previous experience in administration.
2. Junior Management Assistants. Those who entered the service with a management option may profit from courses both more advanced and more specialized than those taken in college. Those who entered on various professional options and

are now employed in such professions can profit very greatly from these courses if they expect, or wish to prepare, to enter into administrative work connected with their professional fields.

3. Employees who wish to broaden their understanding and improve their efficiency through a "tour of duty" by study, in lieu of an actual tour of duty for which they have found no opportunity.
4. Employees with college background who aspire to transfer to a career in administrative management.
5. Administrative assistants and administrative technicians of all kinds.

#### *Requirements—Undergraduate Study*

*Students seeking this statement should consult with and obtain approval of their proposed course of study, from the Registrar, early in their academic program.*

1. High school diploma or equivalent.
2. Twenty-four semester hours of credit in college level courses in the social sciences.

Much importance is attached to general background courses in the belief that they help to broaden the thinking and understanding of the student so that he will possess a wider range of ideas and interests and sounder judgment of social values than would otherwise be the case and, in consequence, will be able to render Government service of a higher level of value. For this reason, these requirements will not be waived.

With the approval of the Registrar of the Graduate School, credit may be given for not more than six hours of other courses which are considered to be of value in connection with work in public administration (such as English literature, composition, philosophy, mathematics, or natural sciences). Introductory courses in the following must be taken:

American or European Government or Political Science  
Economics

American or European History

Public Administration

3. Twenty-four semester hours of credit in undergraduate and graduate courses in public administration, excluding all accounting courses except Federal Government Accounting. The 24 credit hours are to be distributed as follows:



- a. A minimum of six credits from the Division of General Administration.
- b. The remaining eighteen credits may be selected from the Divisions of Organization and Methods Analysis, Financial and Budgetary Administration, Personnel Administration, Legal Administration, Procurement and Property Management, or additional courses in general administration.
- c. Upon prior approval by the Registrar, credit for courses outside the Department of Public Administration (including not more than two courses in office techniques and operations) may be applied when such courses are properly in line with the student's major interest.

### *Requirements—Graduate Study*

*Students seeking this statement should consult with and obtain approval, from the Registrar, of their proposed course of study early in their academic program.*

1. Bachelor's degree. This requirement will be waived only in very exceptional cases when the student can offer educational accomplishments substantially equivalent to a Bachelor's degree and when he has demonstrated by appropriate examination the breadth of knowledge equivalent to such a degree in the social sciences.
2. Twenty-seven semester hours of credit in advanced undergraduate and graduate courses in public administration, of which twelve hours of credit shall be for courses numbered 500 and above, and excluding all accounting courses except Federal Government Accounting. The 27 credit hours are to be distributed as follows:
  - a. A minimum of eight credits from courses in the Division of General Administration, in addition to *c* below.
  - b. Sixteen credits may be selected from the Divisions of Organization and Methods Analysis, Financial and Budgetary Administration, Personnel Administration, Legal Administration, Procurement and Property Management, or additional courses in general administration.
  - c. Three hours of credit for the course, Readings and Papers in Public Administration.
  - d. Upon prior approval by the Registrar, credit for courses outside the Department of Public Administration may be applied when such courses are properly in line with the student's major interest.

## BACKGROUND COURSES

**341. American National Government**

Fall, 2 credits. Repeated in Spring and Summer

CHARLES W. SMITH, JR.  
NORMAN J. SMALL

History and origins of the national Government of the United States; the political process—parties and elections; the legislative process; the functions of the national Government and their administration; courts and judicial review of legislation. Students are advised to take this course before Introduction to Public Administration.

**344. Introduction to Public Administration**

Fall, 3 credits. Repeated in Spring and Summer

DAVID S. BROWN

This course is designed to introduce the student to the elements of public administration. Attention will be devoted to the evolution of administrative organization; organizational types: staff, line, and auxiliary agencies and functions; controls of administration; the broadest aspects of personnel selection, classification, training, movement, and relations; budgeting and fiscal control; federal-state relations; administrative legislation and adjudication. The object of the course is to lay a broad foundation for more intensive courses in management. *Prerequisite:* High school graduation or equivalent, or one course in the Clerical-Administrative Procedures Group, Department of Office Techniques and Operations. Desirable to have had American National Government.

**400. Administrative Operations for Congressional Assistants**

Spring, 2 credits

EVA B. ADAMS

This course deals with the practical administrative problems encountered by secretaries and other staff assistants to U. S. Senators and Congressmen. Such matters as the following will be considered: organizing the office routines; handling veterans' affairs; relations with the executive departments; the practical workings of Congress and assistance with legislative matters; pressure groups; relations with constituents; political organization and campaigns.

**515. The Legislative Process**

Fall, 2 credits

GEORGE B. GALLOWAY

Information about the legislative process which will tend to facilitate effective cooperation between the personnel of the Legislative and Executive Branches. The functions of Congress; organization of Congress; consideration of bills in committees; consideration of bills on the floor; party leadership in Congress; the functions of the Executive regarding legislation; assistance by executive agencies in the legislative process; relation of non-governmental groups to legislation; legislative staff aids; congressional investigations of executive agencies as a control mechanism; correspondence, informational, and informal relations between Congress and executive agencies.

To give vitality and practical value to the subject, basic orientation lectures will be supplemented by seminar sessions, visiting experts, visual aids and planned laboratory techniques designed to provide active student participation in Congressional processes. *Prerequisite:* Undergraduate degree.

**250. American History to 1865**

(See p. 91)

**251. American History Since 1865**

(See p. 91)

**465. The American Tradition**

(See p. 89)

## GENERAL ADMINISTRATION

## COMMITTEE

I. THOMAS MCKILLOP (Chairman)

ROY BLOUGH

JOHN J. CORSON

**450. Principles of Scientific Management**

Fall, 3 credits

I. THOMAS MCKILLOP

Common functional elements of management. Definition of objective; organization; planning; coordination of execution through schedules, budgets, reports, and measurement of progress. Types of motivation. Historic management types. Types of organization. Personal relations and community relations in the several management types. Origin, nature and development of scientific management. Application of scientific management in enterprises outside of government. *Prerequisite:* Bachelor's degree; or a course in American government or public administration and a course in social science.

**519. Work Standards and Work Measurement**

Spring, 2 credits

I. THOMAS MCKILLOP and WILFRED S. WILLIAMS

A study of the most advanced techniques of scientific management concerned with development of work standards and measurement of work loads and performance, and of their adaptability in public administration. Statistical and experimental methods of determining standards. Dangers to avoid in setting standards. Time study. Standards as a dynamic part of operations, and a tool in developing policies on personnel placement and training. Standards as aids in developing budgets, in planning operations, and in individual work planning. Importance of dependable standards, measurement and appraisal of performance to summary statements of progress for the use of higher administrative officials. *Prerequisite:* Practical working experience at Grade GS-7 or above, or permission of instructors.

**540. Scientific Management in Public Enterprise**

Spring, 3 credits

PHILIP C. WARD

The influence of underlying economic and social forces, operating within the structure and processes of a democracy, on organized conduct of public affairs. Major types of public agencies and basic differences between these types. Origin of purpose and policy in public enterprise. Comparison of public and private enterprise as to motivation, objectives, purposes and establishment. Criteria of the quality of public administration. Application of the principles of scientific management in public enterprise including a study of the similarities and contrasts between public and private enterprise. *Prerequisite:* Principles of Scientific Management or equivalent.

**545. Administrative Leadership**

Spring, 3 credits

JOHN J. CORSON

A study of the role of the administrator in public administration at all levels from the division chief up. Analysis of the role, responsibilities and nature of the administrator; of his influence on the organization and the influence of the organization upon him. Consideration of authority and its use.

Consideration of the ways the administrator accomplishes his objectives including analysis of his responsibilities for planning, communication, the development of people, leadership and the maintenance of organizational equilibrium. Special attention is devoted to contrasts between public and private administration. *Prerequisite:* Principles of Scientific Management or equivalent in training or experience.

### 550. Internal Organization Patterns

Fall, 3 credits

PERRY R. TAYLOR

Organization of public agencies and development of procedures for getting work done. The character of management tools in government and in private industry from point of view of middle-management and supervisors. The relations of major subdivisions to top administration and to coordinate subdivisions. Problems of coordination in a decentralized organization geographically dispersed. Importance of clear definition of responsibilities and of vertical and horizontal relations. The essence of supervision and of appropriate techniques. Coordination of activities, policies and objectives of component parts of an organization as an essential part of supervision. Establishment of standards and of procedures for measuring and appraising performance. *Prerequisite:* Principles of Scientific Management or equivalent in training or experience.

### 600. Readings and Papers in Public Administration

Fall, 3 credits. Repeated in Spring

JOHN H. THURSTON, Coordinator

Under the guidance of a senior administrative official, supervised readings with monthly conferences on specified topics of administration or individual research and a paper on some problem or phase of administration. Readings or problem to be investigated are determined in consultation with adviser. *Prerequisite:* Approval of the Registrar; completion of 12 hours of course work in public administration, including Introduction to Public Administration, with at least a B average. This requirement may be waived in the case of persons at Grade GS-9 or above who are engaged in administrative work.

## ORGANIZATION AND METHODS ANALYSIS

### COMMITTEE

HAROLD A. STONE (Chairman)

IVAN ASAY

N. ROBERT BEAR

HARVEY E. BECKNELL

WILLIAM R. DIVINE

GERMAN S. ELLSWORTH

WILLIAM A. GILL

EDWARD W. HARDING

JOSEPH P. LOFTUS

### 405. Principles and Techniques of O & M Work

Year, 2 credits each semester

DAVID D. LEVINE and JOHN D. YOUNG

Deals with the principles and techniques employed in surveying and analyzing organization and methods problems and in formulating solutions for such problems. Emphasizes: planning and conducting various types of surveys; organizing and presenting survey facts; forms analysis; establishing effective relationships; the human element in O&M work; ways of dividing work and controlling work flow; presenting recommendations; installing new methods; follow-up. *Prerequisite:* Applicants will file at the time of registration a statement of their reasons for taking the course. Preference will be given to those engaged in O&M work; registration will be accepted from those not now engaged in O&M work and such persons will be admitted insofar as facilities permit.

### 585. Establishing and Administering O & M Work

Fall, 2 credits

HAROLD A. STONE and JOHNSTON E. LUTON

Deals with the problems of establishing and administering organization and methods work. Covers the way an agency gears itself to improve management to bring about efficiency and economy of operations. Includes responsibilities and authorities of an O&M unit; relationships within and without the bureau, department and the Government; scope of O&M work; control and management of survey projects; long and short term programs of work; selecting staff; gaining acceptance of recommendations. Emphasis is placed upon different sets of cir-



cumstances encountered in O&M work. Cases are presented both by students and by instructors. This course is designed for persons who wish to expand their knowledge of the administrative phases of O&M work. It is essential therefore that they have previous education or experience or both in the practical application of its techniques. *Prerequisite:* Completion of courses in the principles of O&M analysis and consent of instructor, through Graduate School office.

**420. Procedure Systems and Methods of Developing Instructions** (See p. 46)

**422. Systems for Reports and Forms Management** (See p. 47)

**519. Work Standards and Work Measurement** (See p. 63)

### FINANCIAL AND BUDGETARY ADMINISTRATION

**360. Hospital Business Administration I: Accounting, Statistics and Finance**

Fall, 2 credits

DAVID H. SPANIER and SPECIALISTS

Principles of hospital fund accounting; general fund income, expense and balance sheet accounts; temporary and endowment fund accounts; plant fund accounts. Adjusting and closing entries; prepaid and deferred items; preparation of trial balances. Hospital patient and hospital service statistics. Hospital financial and statistical statements. Cash receipts and accounts receivable procedures. Cash disbursements and accounts payable procedures. Inventories. Credits and collections. Payroll and personnel procedures. Check lists of equipment and supplies; depreciation; reserves. *Prerequisite:* Principles of Accounting or the equivalent in experience.

**361. Hospital Business Administration II: Cost Analysis Methods and Budgeting**

Spring, 2 credits

DAVID H. SPANIER and SPECIALISTS

Principles of hospital cost analysis methods, rate structures and budgeting. Detailed cost analysis problems, organization of accounting department, principles of internal control and food cost accounting. *Prerequisite:* Hospital Business Administration I or its equivalent in experience.

**[525.] Financial Organization and Procedures of the Federal Government**

CARL W. TILLER

**116. Federal Budgetary Procedure** (See p. 44)

**635. Budgetary and Financial Administration: Budget Formulation**

Fall, 2 credits

RALPH S. ROBERTS, JOSEPH C. WHEELER and STAFF

First part of an advanced, two-semester program for experienced budget and general administrative personnel. Covers the broad phases of budgetary and financial administration in the Federal Government primarily from the standpoint of the operating department.

The course deals with the pre-appropriation phases of budgeting, including formulation, review, and congressional enactment of the budget. Topics

discussed include: the role of budgeting in program formulation; the role of bureaus, departments, Bureau of the Budget, the President and Congress in budgeting; content of the budget and of departmental estimates and related budgetary materials; the investment and capital-outlay budgets; review and analysis of budget estimates; budget justification; legislative-administrative relationships in budgeting. *Prerequisite:* Bachelor's degree and an introductory course in public administration; or experience at a responsible level in budgetary, financial or general administration; or consent of instructor.

### 636. Budgetary and Financial Administration: Budget Execution

Spring, 2 credits

RALPH S. ROBERTS, JOSEPH C. WHEELER and STAFF

This is the second part of an advanced two-semester course covering the broad phases of budgetary and financial administration in the Federal Government. Several officials from bureau and department budget offices and other budgetary and financial organizations lecture and lead discussions.

This semester deals with the execution of the budget after it is enacted by Congress and the relationships of administrative planning and control, accounting, auditing, and financial reporting to budget execution. *Prerequisite:* Bachelor's degree and an introductory course in public administration; or experience at a responsible level in budgetary, financial or general administration; or consent of instructor.

## PERSONNEL ADMINISTRATION

### COMMITTEE

H. DEAN COCHRAN (Chairman)

MILDRED C. BENTON  
JAMES L. BUCKLEY  
L. M. CORRELL  
VIRGIL L. COUCH  
C. O. HENDERSON

G. E. HILBERT  
HAROLD LEICH  
ARTHUR B. MCLEAN  
ROSS POLLOCK  
JOSEPH E. WINSLOW

114. Federal Personnel Procedure (See p. 44)

214. Advanced Federal Personnel Procedure (See p. 45)

201. Supervision (See p. 45)

### 305. Accident Prevention as a Factor in Good Management

Fall, 2 credits

ROBERT L. JENKINS

Designed for those in junior staff positions desiring a broad understanding of accident prevention, and for supervisors and administrators wishing to have a general familiarity with accident prevention work in the context of good management. Covers basic approaches to accident prevention; division of responsibilities; technical, economic and social aspects of the accident problem; organization and mechanics of an accident prevention program; and established techniques for reducing accidental wastes in all work programs.

### 430. Public Personnel Administration

Fall, 2 credits. Repeated in Spring

VIRGIL L. COUCH

Designed for supervisors and administrators wishing to have general familiarity with personnel work, for those in junior personnel staff positions desiring a broad understanding of personnel administration, and for those desiring to enter the field who need a foundation for the more specialized courses in the

personnel field. Personnel problems which arise when people are associated together in a work situation; basic personnel policies and practices necessary and useful in treating personnel problems; differences between responsibilities, with respect to personnel administration, of the supervisor and the personnel officer; the various phases of personnel work; study of merit system and forms of organization; civil service legislation at various governmental levels; relationships between the Civil Service Commission and operating agencies and personnel offices of latter; trends in public personnel administration and its relationship to overall management. *Prerequisite:* One of the following: Introduction to Public Administration; Course 108 or 114 in the Department of Office Techniques and Operations; Grades GS-4 or above in personnel work; 60 semester hours of college work.

### 435. Selection and Placement

Fall, 2 credits

ELINOR HAYES

Survey of the historical development and current thinking and practices in recruitment, selection, and placement of employees, with special reference to the Federal civil service. Emphasis in lectures and discussion is directed toward understanding basic principles which underlie policies and methods in public employment, with only incidental attention to the development of skills in such specific techniques as interviewing, examination preparation and administration, and reemployment investigation. The course is intended for students who wish to understand the "why" of public selection and placement procedures, rather than for those primarily interested in how such procedures are carried out. *Prerequisite:* One of the following: Course 344 or 430 in Public Administration; Grade GS-4 or above in personnel work; 60 semester hours of college work.

### 437. Psychological Tests and Measurements

Spring, 2 credits

ALBERT MAPOU

Acquaints the student with different types of psychological tests, rating scales, interviews and other evaluation techniques and their uses in the fields of personnel administration, employee counseling, vocational guidance, and education. Useful to personnel workers, teachers, counselors, test examiners, and of general interest to the student of psychology. Topics covered: the theory of measurement; evaluation of measuring devices; use and interpretation of tests; types of aptitude, achievement and personality tests; the use of rating scales and standardized interviews. *Prerequisite:* A course in psychology and one in statistics; or experience in personnel or guidance work; or consent of the instructor.

### 444. Position Classification

Fall, 2 credits. Repeated in Spring and Summer

WILLIAM C. LAXTON and JOSEPH P. FINDLAY

Covers the fundamental concept of position classification and its uses; relation of classification to compensation and other phases of personnel management; analysis of Classification Act of 1949; identification, analysis and application to specific positions of factors determining class and grade levels; discussion of job evaluation techniques; and application of position classification in the Federal service including operating policies, practices and procedures. *Prerequisite:* One of the following: Courses 344 or 430 in Public Administration; Grade GS-4 or above in personnel work; 60 semester hours of college work.

### 565. Employee Relations and Employee Services

Fall, 2 credits

ASTRID W. KRAUS

This course defines the basic content of an employee relations program. Deals with the formulation of employee relationship policies; the development

and application of grievance and other appeals procedures; the techniques for sharing information with employees, for handling employee discipline and for assisting supervisors to appraise and deal with employee problems; the provision of essential employee services, such as housing, child care, transportation, recreation, health and educational information, and so forth, necessary to recruit and maintain an adequate work force. Discussion will also be devoted to the relationship of Government as an employer to its employee groups; the history of union-management relationships in the Federal service; present day problems of affiliation, "collective bargaining" and areas of negotiation on policy formulation and settlement of employee grievances. *Prerequisite:* College degree or personnel work at Grade GS-7 or above or consent of instructor.

### **580. Classification and Pay Administration**

Fall, 2 credits (every third year)

JAMES L. BUCKLEY, ISMAR BARUCH and SPECIALISTS

Analyses and discussions of: policy development and execution in administering the Federal position classification and pay plans; roles of the Civil Service Commission, Bureau of the Budget, Congress and Congressional committees in the policy and in other phases of classification and pay administration; policy coordination between classification and pay administration and other phases of personnel management and general administration; strengths and weaknesses of the present Federal classification system. *Prerequisite:* Knowledge of the technical principles of Federal classification and pay administration gained through formal study and through broad administrative experience in classification and pay administration.

### **[582.] Personnel Division Management**

VIRGIL L. COUCH

### **620. Administration of Training**

Fall, 2 credits

E. R. DRAHEIM

Designed to give special assistance in training administration to present or potential training officers and to administrators and supervisors who do not have the services of a training officer. Training as a tool of management; the administration of training; organizing to get training done; group dynamics—the use of group participation and judgment in planning for and getting training done; career development—the individual's part in his own development; the supervisor's job in developing employees; application of the laws of learning to in-service training; review and demonstration of the use of some of the methods for effective training; techniques and devices to get quick acceptance of ideas; training administrators and supervisors to select and use those methods, techniques and devices which are the best for given situations; methods of evaluating training programs and techniques.

### **730. Training Problems—Seminar**

Spring, 2 credits

C. O. HENDERSON and JOHN MOORE

A systematic study of some of the more basic problems of employee training in the public service, for the purpose of adding to the general understanding of how best to get training done. Open to training administrators and others who have the immediate responsibility for administering training programs. Specific problems discussed are determined by the members of the seminar.

Attendance at the seminar is by invitation. Interested persons may apply in writing to the Graduate School, stating appropriate training and experience. Participants selected register in the usual manner.



## LEGAL ADMINISTRATION

## COMMITTEE

ASHLEY SELLERS (Chairman)

THOMAS J. FLAVIN

RALPH F. KOEBEL

DAVID REICH

**320. Introduction to Administrative Law and Procedure**

Fall, 2 credits

EDWARD C. JOHNSON

A survey, for the general student, of the nature of administrative law, its subject matter, and methods of administration. The rule-making and adjudicative or determining procedures by federal and state regulatory agencies and the remedies against administrative action receive special consideration.

The increased complexity of modern society has meant that administrative tribunals have played an expanding role in the regulation of life and property. This course includes a study of the law which controls and the regulations which are made by governmental officers to implement that law. A survey of economic and social forces involved in regulatory action. Material used includes regulations, orders and decisions of federal, as well as state and municipal bodies, which acquaints students with current developments in administrative law and procedure. Topics covered include: powers and duties of administrative authorities as they relate to the supervision of public, as well as private interests; means of enforcing decision; remedies against official action; legal qualifications for office; legal disqualification of officers; appointment, tenure, removal and compensation of officers; and related matters.

**422. Business Law**

Year, 2 credits each semester \*

EDWARD C. JOHNSON

Aspects of law essential to the conduct of modern business. Forms of business organization, bailments, property, sales, mortgages, negotiable instruments, contracts. *Prerequisite:* Principles of Accounting or equivalent, or consent of instructor.

\* This course is so arranged that students may attend both semesters or either semester. No subject matter, however, will be repeated.

**425. Legal Aspects of Investigation—Criminal Evidence and Procedure**

Spring, 2 credits

RALPH F. KOEBEL

Designed to provide investigative personnel and those desiring to prepare for such work, a background and insight into the legal aspects of their investigations: what types of evidence to seek; circumstances and conditions under which the evidence is to be obtained in order to have adequate probative value; and how to prepare such evidence for presentation in court or other procedure. Since all investigations are potential sources of prosecution, the requirements of criminal evidence and procedure often reach into the early stages of investigation. The instruction is designed to provide understandable information without overemphasis of technical aspects.

**[480.] Copyright Law (1952-53 and alternate years)**

Spring, 2 credits

LOUIS C. SMITH

**680. Administrative Law**

Spring, 2 credits

ASHLEY SELLERS

Study of administrative tribunals; constitutional and statutory limitations on administrative discretion; requisite of a fair hearing; judicial control over admin-

istrative action. *Prerequisite:* Bachelor's degree with courses in public administration, public law, or government regulation; or experience in regulatory work; or Introduction to Administrative Law and Procedure.

## **[820.] Problems of Federal Administrative Regulation**

Spring, 2 credits

THOMAS J. FLAVIN

### **PROCUREMENT AND PROPERTY MANAGEMENT**

#### **COMMITTEE**

JAMES SCAMMAHORN (Chairman)

WILLIAM E. FEE

CLIFTON E. MACK

CHARLES E. OFFUTT

S. A. SNYDER

FRANK H. SPENCER

RAY WARD

**113. Federal Property Procedure** (See p. 43)

**115. Federal Purchasing Procedure** (See p. 44)

**405. Principles of Specifications** (See p. 95)

## **455. Management of Governmental Supply**

Spring, 2 credits

TONY M. BALDAUF

An advanced course covering the broad phases of handling and managing Government supply activities. Deals with supply policies, organization and management, finances, and laws governing supply. Topics: (1) organization and management of purchasing offices; (2) organization and management of warehouses; (3) property accounting, management and distribution of supplies and equipment; (4) management and training of purchasing and warehousing personnel; (5) procurement function efficiency determination and importance of project service objective and its relation to good Government purchasing and warehousing; (6) decisions of the Comptroller General and regulations affecting procurement; (7) nature of public contracts as compared with private contracts; (8) Federal Specifications and specification studies, including development and writing; (9) delivery requirements, inspection of supplies and liquidated damages; (10) market analysis and conditions which affect seasonal project work of Government bureaus; (11) laws which affect procurement contracts such as Walsh-Healey Act, Davis-Bacon Act, Eight-Hour Law; (12) functions of General Accounting Office, Federal Supply Service, Federal Prisons Industries and surplus disposal agencies in the supply scheme; (13) traffic problems and transportation studies on methods of shipment; (14) new developments in procedures affecting supply and dissemination of information to field supply units. *Prerequisite:* One of the following: Introduction to Public Administration; Federal Purchasing Procedure; Federal Property Procedure; Grade GS-4 or above in purchasing work; 60 semester hours of college work.

## **638. Government Defense Contracts**

Fall, 2 credits

JULIUS SILVERSTEIN

Laws and problems in defense contracting by the Federal Government, including such subjects as cost-plus contracts, contingent fees, priorities, subcontracting, escalation, financing, renegotiation, contract termination, and surplus property.

## ACCOUNTING

## COMMITTEE

JOHN C. COOPER (Chairman)

PAUL L. APPELMAN  
WARNER H. HORD  
LAWRENCE O. MANLEY

CHARLES N. MASON  
ROBERT W. MAXWELL  
HERSCHEL C. WALLING

The Graduate School offers accounting courses primarily as a means of training for the *public* service. The curriculum necessarily includes courses in general accounting because the basic principles are essential for Government accounting.

The scope of accounting in the Federal service is wide. There are increasing demands for accountants having a knowledge of commercial as well as Government accounting. These demands have come as a result of the formation of many Government corporations and Federal regulatory agencies. Hence, the accounting program required for a Certified Statement of Accomplishment is broad enough to cover not only the regular appropriation accounting of the Federal Government, but also the accounting training needed for many other governmental activities. The program is comprehensive enough to meet both advanced training for the Government service, and also, if courses are carefully selected, the usual educational requirements for C.P.A. examinations. Students planning to take C.P.A. examinations should know the requirements of the state in which they plan to take the examination. In general, their study, in addition to accounting, should include the following: Principles of Economics, Corporation Finance, Investments, Mathematics of Finance, Business Law, Statistics, Business English, Principles of Marketing and Industrial Management.

## CERTIFIED STATEMENT OF ACCOMPLISHMENT IN ACCOUNTING

*Requirements*

1. High school diploma or equivalent.
2. Thirty-six semester hours of credit in courses outlined below and distributed as follows:
  - a. All of the required courses.
  - b. No less than three semester hours credit from the Accounting Elective Courses.
  - c. No less than six semester hours credit from the Related Elective Courses.
  - d. The remaining six semester hours credit may be taken in either of the two elective groups.

## COURSES LEADING TO CERTIFIED STATEMENT OF ACCOMPLISHMENT IN ACCOUNTING

### REQUIRED COURSES

<i>Courses</i>	<i>Number of Semesters</i>	<i>Semester Hours Credit</i>
Principles of Accounting .....	2	6
Intermediate Accounting .....	2	6
Cost Accounting .....	1	3
Auditing .....	2	4
Advanced Accounting .....	1	3

### ACCOUNTING ELECTIVE COURSES

Federal Government Accounting .....	1	3
Federal Tax Accounting .....	1	3
Analysis and Interpretation of Financial Statements .....	1	2
Mathematics of Finance .....	1	3
Federal Accounting Procedure .....	1	3
Federal Auditing Procedure .....	1	2
or Advanced Federal Auditing Procedure .....	1	2
Budgetary and Financial Administration .....	2	4
Advanced Accounting Problems .....	2	6
Accounting Systems .....	1	2
Cost Accounting (Second Semester) .....	1	3

### RELATED ELECTIVE COURSES

Business Law .....	2	4
Principles of Economics .....	2	6
Principles of Statistical Analysis .....	2	6
Writing Procedures and Instructions .....	1	2
or Introduction to Official Writing .....	1	2

### 352<sup>a</sup>. Principles of Accounting—First Half

Fall, 3 credits. Repeated in Spring and Summer

HERBERT G. MARSHALL  
WILLIAM H. ROWE  
STANCIL M. SMITH

Elementary principles of accounting; discussion and problems. At the end of the semester students will be prepared to do the accounting necessary for a small business organization; i.e., keep a complete set of books, draw up statements at the end of the fiscal period, adjust the accounts for accruals, deferred items, depreciation, etc., and close the books. *Prerequisite:* High school graduation or equivalent.

### 352<sup>b</sup>. Principles of Accounting—Second Half

Spring, 3 credits. Repeated in Summer

HERBERT G. MARSHALL  
WILLIAM H. ROWE  
STANCIL M. SMITH

Continuation of first half covering more advanced principles of accounting; accounting for partnerships, corporations and manufacturing; depreciation policies and analysis of financial statements. *Prerequisite:* First half or equivalent.

### 353<sup>a</sup>. Intermediate Accounting—First Half

Fall, 3 credits

WARNER H. HORD

Advanced principles of manufacturing accounting, corporation accounting, and valuation as applied to current assets, fixed assets, intangibles, and liabilities, reserves and funds, installment sales. *Prerequisite:* A first year course in accounting.



**353<sup>b</sup>. Intermediate Accounting—Second Half**

Spring, 3 credits

WARNER H. HORD

Advanced principles of partnership accounting, including formation, operation, and dissolution; joint ventures; consignments; agencies and branches; application of funds. *Prerequisite:* First half or equivalent.

**354. Federal Government Accounting**

Fall, 3 credits. Repeated in Spring

CHARLES N. MASON

A review of the development of the accounting system for Federal funds and the present financial organization in which the accounting is performed with attention to the accounting responsibilities of each segment of the organization, including the Treasury Department and the General Accounting Office. Detailed study is given to the accounting problems of administrative agencies with special emphasis on the principles of controls, financial reporting problems, and recent developments in accounting in the Federal government. *Prerequisite:* Two years of Commercial Accounting, or Federal Accounting Procedure and one year of Principles of Accounting or the equivalent.

**360. Hospital Business Administration I: Accounting, Statistics and Finance**

(See p. 65)

**361. Hospital Business Administration II: Cost Analysis Methods and Budgeting**

(See p. 65)

**420. Advanced Accounting**

Fall, 3 credits

LAURENCE W. ACKER

Advanced principles of accounting, consolidated statements; foreign exchange; receivership; estates and trusts; budgets; public accounts. *Prerequisite:* Intermediate Accounting or equivalent.

**423. Mathematics of Accounting and Investment**

Spring, 3 credits

RALPH R. BOTTS

Calculation of compound interest, compound discount, sum of annuities, present value of annuities and perpetuities; accumulation of sinking funds and amortization of debts by installments. Calculation of bond yields, bond values, premiums and discounts. Computation of depreciation by sinking fund method and fixed percentage of book value method. Some study is given to life probabilities and the computation of premiums and reserves for the more common types of life insurance and annuities. Accounting applications and entries will be discussed for those students interested in the accounting aspects.

**510. Analysis and Interpretation of Financial Statements**

Spring, 2 credits

LAURENCE W. ACKER

Study of the flow or movement of funds as reflected in the financial statements. Use of ratios and other indices in the analysis and interpretation of financial position together with a consideration of trends and variations therein. Subject matter is developed through lectures and problems, supplemented with published financial statements. Each student prepares, under supervision of the instructor, an analysis of the current financial statements of some prominent corporation together with a comparison with the principal competitors in the field. *Prerequisite:* Intermediate Accounting.

**642. Cost Accounting**

Year, 3 credits each semester (alternate years)

ALFRED D'ALESSANDRO

A thorough and comprehensive treatment of the principles of cost accounting, together with the methods of their application to specific problems. By

means of lectures, textbook study, and problems, full consideration is given to the methods of cost accounting for materials, labor, direct and indirect expenses in their relationship to specific job orders; process, departmental and standard costs; and the control accounts. *Prerequisite:* Principles of Accounting.

### 645. Federal Tax Accounting

Fall, 3 credits

EUGENE C. MOYER

Federal taxation presented from the accounting viewpoint. Special attention given to income taxation. *Prerequisite:* Principles of Accounting; accounting experience desirable.

### [646.] Advanced Accounting Problems (1952-53 and every third year)

Year, 3 credits each semester

LAURENCE W. ACKER

### 693. Auditing

Year, 2 credits each semester

JOHN C. COOPER

The fall semester is devoted to the study of the fundamental principles of public or commercial-type audits. Consideration is given to the purposes and types of audits; the responsibility of the auditor; planning and performing audits. Special emphasis is placed on problems in audit theory and practice such as are generally given in C.P.A. examinations.

In the spring semester, emphasis is placed on case studies in auditing and the application of audit principles. Special consideration is given to the field of internal audit as a tool of management and the utilization of internal audit in Government. *Prerequisite:* Intermediate Accounting.

### 694. Specialized Federal Accounting Systems

Fall, 3 credits

EDWIN T. NOLAN and SPECIALISTS

Designed to acquaint the students with the basic principles and standards of systems design and with current developments and improvements in Federal accounting. The systems of a diversified group of Federal agencies are used as case studies. *Prerequisite:* Intermediate Accounting, Federal Government Accounting, and Cost Accounting, or the equivalent.

### [695.] Accounting Systems (1952-53 and alternate years)

Fall, 2 credits

EDWIN T. NOLAN

### 422. Business Law

(See p. 69)

# Social Sciences

## DEPARTMENTAL COMMITTEE

SHERMAN E. JOHNSON (Chairman)

BUSHROD W. ALLIN  
H. DUNCAN HALL  
PAUL E. NYSTROM  
HAROLD B. ROWE

CARL C. TAYLOR  
JAMES E. THIGPEN  
HARRY C. TRELOGAN (Vice-chairman)  
FREDERICK V. WAUGH

## PURPOSE AND SCOPE

Social science deals with people and the problems of human relationships, as contrasted with natural or physical science which deals with things and the problems arising out of physical relationships.

The problems of social organization and operation have become both absolutely and relatively more important with the increase in complexity of our industrial civilization. More and more, people are concerned with the organization of production, the distribution of goods and income, and with price policies. The individual as a consumer and investor, the businessman and the farmer as producers, find increasing need for a knowledge of economics and other social sciences. Large corporations are employing growing numbers of economists to help in the formulation of policy. Psychologists and social workers are finding a demand for their services in personnel work. And, the large number of Federal, state and local government agencies need more people adequately trained in social science.

Social science is divided into a number of closely allied fields including economics, sociology, political science, history, law, and psychology. A broad grasp of any one of these subjects implies at least some familiarity with the others, because of the many interrelationships among these studies. Yet the continued development of each social science has given rise to larger and still larger bodies of knowledge relating to it, until only through a considerable degree of specialization can the student hope to master any one part. Thus the great need is for people who have concentrated sufficiently on one phase of a social science, such as marketing in economics, to be thoroughly familiar with the details of fact and principles involved, yet who also have a broad underlying training in the allied fields.

The courses offered by the Graduate School are designed to aid in acquiring a general background in the social sciences, as well as the specialized training in particular fields which is necessary for successful work in many Government departments and in private business.

## SUGGESTIONS FOR PROGRAM OF STUDY

To meet the specific needs of students who have different educational and experience backgrounds and different immediate interests, the Graduate School has developed the following types of courses in the social sciences:

(1) *Courses of General Interest.* Several of the social science courses are designed to provide information of general interest to a large group of persons who do not expect to become specialists in a particular field, but who desire to obtain some background in a subject, as a basis for work in related fields, or purely as a personal interest. An employee in the personnel office of a Department of Agriculture branch responsible for market news and inspection services may wish to take a course in marketing in order to learn something about the subject matter dealt with by the personnel of the branch, or a course in psychology as an aid in dealing with the personal problems which are daily presented to employee counselors. The secretary to an economic research director may want a course in the principles of economics in order to become familiar with the terminology and general economic concepts to which her stenographic and filing duties relate. An almost unending array of job needs of this kind offers opportunities to the alert and ambitious employee to increase his capacity and usefulness to his employer. The many promotions within the Government service which can be traced directly to such training testify to the fact that study in the social sciences is profitable.

These courses of general interest are at the undergraduate level, such as Introductory Survey of Economics, Introduction to the Study of Human Relations, Introduction to Marketing, and General Psychology.

(2) *Undergraduate Basic Courses.* These courses are designed to provide a basic social science background for students who have not completed their undergraduate training or who have not had an opportunity to take the basic background work in economics and the other social sciences as a part of their qualification for Bachelor's degree work. These courses provide an opportunity for persons who enter the Government service in the lower grades to prepare themselves for professional advancement.

(3) *Graduate and Advanced Undergraduate Courses.* These courses offer work of graduate level but they are also open to undergraduates of advanced standing. Students who are registered for graduate credit will be expected to do more work in these courses than those who register for undergraduate credit.

(4) *Strictly Graduate Courses.* These courses are offered only



for graduate students who have adequate background. They are usually conducted on a seminar basis and they require a great deal of participation and preparation of material by the students themselves.

Students working for graduate degrees should consult educational advisers in the institution where they expect to receive their degree. If they have not selected such an institution they should confer with advisers in the Graduate School who are teaching in the particular field in which they expect to concentrate. In general, students who wish to map out a course of study leading toward a graduate degree should plan their work to include:

- (1) Completion of basic undergraduate courses.
- (2) Advanced courses in social science fields related to the particular field of concentration. For example, a student majoring in economics should consider advanced courses in statistics, economic history, sociology or some other related field in order to broaden his educational background.
- (3) Advanced courses in the field of concentration. Students who expect to major in one of the social science fields should begin their graduate work by taking the basic graduate courses in that special field. For example, students who expect to major in any field of economics should plan to take at least six credits of work in advanced economic theory and six credits in monetary and cycle theories. With these courses as a foundation, the student can begin to specialize in courses in his particular field of concentration.

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## GENERAL ECONOMICS

### COMMITTEE

BUSHROD W. ALLIN (Chairman)

ROY J. BURROUGHS  
JAMES P. CAVIN

JOHN CORDON DAVIS  
HOWARD L. PARSONS

HOWARD S. PIQUET

Adequate foundation training in general economics is essential for satisfactory accomplishment in the study of any specialized branch of the subject. Hence, the primary objective in developing the following list of courses has been that of providing the basic work needed, by students who wish to carry out a systematic plan of study, at both undergraduate and graduate levels. In addition, a course on research methods is listed under this head. It is of general interest to students majoring in economics.

## 110. Introductory Survey of Economics

Summer, 2 credits

ROY J. BURROUGHS

A mountain-top view of economic history, institutions, statistics, and analysis. Descent into the numerous valleys that invite detailed exploration is left to later courses. The course is a useful introduction for the student who wishes to take the subsequent year's course in *Principles of Economics*. It serves also to introduce the subject to those who will take no more formal economics but for whom life itself is the textbook.

## 201. Principles of Economics

Year, 3 credits each semester

ROY J. BURROUGHS and BUSHROD W. ALLIN

A basic course designed to equip the student with the simpler tools of economic analysis and with an understanding of the more important institutions of the economic system. Economic analysis is developed with respect to operations of the price system, behavior of individual consumers and business firms, and also the behavior of the total economy including the allocation of resources, the distribution of the total product to the factors of production and the conditions which favor high employment and a large national income. *Prerequisite:* A year of college work or its equivalent.

## 418. Public Finance and Taxation

Spring, 2 credits (alternate years)

TYLER F. HAYGOOD

A study of governmental fiscal policy. Current developments, problems, and controversies. Analysis of tax systems, government spending, and public debt management, and their economic effect. Study of specific federal, state, and local taxes. *Prerequisite:* A course in economics.

## [480.] Money and Banking (1952-53 and alternate years)

Year, 2 credits each semester

RICHARD A. RADFORD

## 548. Economic Analysis

Year, 2 credits each semester

HOWARD L. PARSONS and JAY ATKINSON

The first semester deals intensively with economic theory as a tool of analysis for problems of consumption, production and the markets—with particular reference to the various degrees of competition. Analytical models such as the firm, the industry and the household form the core of the discussions.

The second semester deals with the theoretical tools of analysis for problems of the economy in the aggregate. Keynes' General Theory of Employment, Interest and Money is the basic document on which the semester's work rests. The various and numerous additions and criticisms that have followed Keynes' General Theory shape the remainder of the discussions.

The specific focus of the course is on the ways of thinking and factors considered by individuals and groups in the economy as they choose among alternative economic actions. As part of these considerations, special attention is given to understanding the effect of the particular institutions such as different forms of government, price control, production control, etc., on these choices. *Prerequisite:* A course in principles of economics.

## 705. History of Economic Thought

Fall, 3 credits (alternate years)

MAX J. WASSERMAN

The economic theories of the most important schools and economists from Greek antiquity through Alfred Marshall (1895). The schools covered are the Greek, Medieval Period, Mercantilism, Physiocrats, the Classical School, Socialism of 1848, Historical School, Psychological School and the Neo-Classical School. The theories studied are projected against the factual and philosophical background of the period. *Prerequisite:* Principles of Economics or equivalent.

**706. Modern Economic Thought**

Spring, 3 credits

BUSHROD W. ALLIN and JAMES P. CAVIN

A review of the ideas of the leading economic theorists of the past fifty years, including those of Marshall, Veblen, Commons, Mitchell and Keynes. *Prerequisite:* Principles of Economics or equivalent.

**[728.] International Financial and Trade Policies (1952-53 and alternate years)**

Fall, 2 credits

OSCAR ZAGLITS

**712. Research Methods in Social Sciences**

Spring, 2 credits (alternate years)

O. C. STINE and SPECIALISTS

This seminar considers scientific methods appropriate for the social sciences, with special attention to economics, then considers application of scientific methods to research in marketing, with some special attention to pricing and price level. *Prerequisite:* Training equivalent to that required for a Bachelor's degree, including basic elementary training in statistics and economics.

**AGRICULTURAL ECONOMICS****COMMITTEE****BENNETT S. WHITE (Chairman)**

PHILLIP F. AYLESWORTH

HORACE R. JOSEPHSON

FLOYD E. DAVIS

HAROLD B. ROWE

R. W. JONES

ROBERT M. WALSH

The great importance of enlarging and improving knowledge of the economics of agriculture is generally recognized. Constructive accomplishment in this field requires thorough training in economics combined with a comprehensive grasp of its application to the special conditions of agriculture. Such a balanced combination can best be achieved by following a systematic course of study appropriate to the particular area of concentration desired. The courses offered by the Graduate School permit students to carry out such plans of study with concentration in the economics of agricultural production, agricultural finance, prices, and marketing. The electives and general interest courses provided also permit the adaptation of study plans to meet the special interests of individual students.

Shortage of well-trained marketing personnel, at both Federal and State levels, critically handicaps developing a well-rounded program under the Agricultural Research and Marketing Act. The greatest immediate need is for men with advanced training who can undertake independent work in new fields. The broad expansion of activities scheduled under the Act also will continue and intensify the need for adequately prepared college graduates. On both problems the Department of Agriculture is cooperating closely with land-grant institutions. Joint committees have analyzed and mapped out attack on these problems. As part of this

plan the Graduate School has given special advanced training to Washington personnel engaged in marketing work, and regularly offers both introductory and advanced courses in this field.

### CERTIFIED STATEMENT OF ACCOMPLISHMENT IN AGRICULTURAL ECONOMICS

The Graduate School offers a Certified Statement of Accomplishment to students who have completed 30 credits of graduate work in agricultural economics, including the basic graduate courses in economics. To qualify, it is necessary to follow the specific sequence of courses that are listed for three fields of concentration indicated below.

The Certified Statement of Accomplishment is not an advanced degree, but it constitutes evidence of completion of an organized course of study in the field of agricultural economics. It is a certification that the student has completed a program of study which prepares him for effective public service in agricultural economics work. The Graduate School plans to extend the granting of Certified Statements of Accomplishment to other social science fields as there is sufficient demand.

### COURSES LEADING TO CERTIFIED STATEMENT OF ACCOMPLISHMENT IN AGRICULTURAL ECONOMICS

#### *(With Concentration in Specified Fields of Application)*

#### BASIC UNDERGRADUATE COURSES

Required foundation courses. Carry undergraduate credit only and may not be used to meet the credit hour requirement for the certified statement. Equivalent courses will be accepted by transcript from other institutions.

The number in parenthesis after course title indicates semester hour credits.

<i>Economics of Production</i>	<i>Agricultural Finance</i>	<i>Prices and Marketing</i>
Principles of Economics (6)	Principles of Economics (6)	Principles of Economics (6)
Principles of Statistical Analysis (6)	Principles of Statistical Analysis (6)	Principles of Statistical Analysis (6)
Economics of Farm Production (3)	Economics of Farm Production (3)	Economics of Farm Production (3)
Introduction to Marketing (3)	Introduction to Marketing (3)	Introduction to Marketing (3)

#### REQUIRED BASIC GRADUATE COURSES

Economic Analysis (4)	Economic Analysis (4)	Economic Analysis (4)
Money and Banking (4)	Money and Banking (4)	Money and Banking (4)

#### REQUIRED SPECIALIZED GRADUATE COURSES

Farm Management (2) or Land Economics (4)	Agricultural Finance (3)	Economics of Marketing (4)
Agricultural Policies (2)	Farm Management (2) or Land Economics (4)	
Economics of Production (3)	Agricultural Finance (3)	Agricultural Policies (2) Marketing (3)

#### ELECTIVE GRADUATE COURSES

Select courses in consultation with Graduate School advisers to complete the 30 graduate credits required for certified statement of accomplishment.



## 203. Introduction to Marketing

Fall, 3 credits (alternate years)

BENNETT S. WHITE

A preliminary course intended to provide orientation for the study of marketing as (1) a type of production which supplies essential services, and (2) a valuation process in which the prices of agricultural commodities are established. Marketing machinery costs, functions, methods and practices are surveyed. Marketing specialists of the Department of Agriculture will lead discussions relating to particular commodities and special problems. *Prerequisite:* Principles of Economics or the equivalent.

## [207.] Economics of Farm Production (1952-53 and alternate years)

Fall, 3 credits

KENNETH L. BACHMAN

## 407. History of Agricultural Policy in the United States

Year, 2 credits each semester

EVERETT E. EDWARDS

An introductory historical survey of agricultural policies from the first settlements to recent times; the principal forces shaping agricultural policies in past periods; the interrelationships of agricultural policies and contemporaneous economic and social theories and policies. Given as a reading course.

## [409.] Farm Management (1952-53 and alternate years)

Spring, 2 credits

WYLIE D. GOODSELL

## [410.] Land Economics (1952-53 and alternate years)

Fall, 3 credits

V. WEBSTER JOHNSON

## 411. Agricultural Finance

Fall, 3 credits (alternate years)

DONALD C. HORTON

Influence of the economic characteristics of different types of farms on their capital requirements; sources of agricultural capital—operator, landlord, and creditor investment; complementary and competitive relationships among farm credit institutions and other sources of agricultural capital; problems of institutions extending credit to agriculture; application of general principles of financial management to the farm business. *Prerequisite:* Economics of Farm Production or a course in Money and Banking.

## 412. Risk and Insurance

Spring, 3 credits (alternate years)

DONALD C. HORTON and RALPH R. BOTTS

Review of the economic theory of risk with particular consideration to the risk problems encountered in farm production; analysis of present methods of risk-bearing, including several types of public and private insurance; appraisal of suggested method of covering the economic risks encountered in farming. *Prerequisite:* Economics of Farm Production, or equivalent.

## [414.] Economics of Marketing (1952-53 and alternate years)

Year, 2 credits each semester

H. M. SOUTHWORTH and HARRY C. TRELOGAN

## 416. Agricultural Cooperation (alternate years)

Spring, 3 credits

MARTIN A. ABRAHAMSEN, HAROLD HEDGES, and STAFF

Covers basic principles of agricultural cooperation and provides understanding of the application of these principles in every-day operation of cooperatives. Attention also is given to: (1) development of agricultural cooperation in the United States and foreign countries; (2) place of cooperation in modern society, giving consideration to the application of basic economic concepts; (3) operating

practices, including management, membership and public relations, financing, integration in manufacturing, and sales and distribution; (4) legal and organizational problems; and (5) appraisal of possibilities and limitation of cooperatives. *Prerequisite:* A course in economics.

#### 461. Transportation Rates and Rate Determination

Fall, 2 credits

ABBEFORD S. DOLCH

The course is designed to give the basis for a general understanding of the use of traffic documents, commodity classifications, tariffs and traffic publications for the several forms of transportation, and a knowledge of rate principles and history of major rate adjustments. *Prerequisite:* Some general experience with rates and tariffs.

#### 462. Traffic Management

Spring, 2 credits

JAMES F. PERRIN

Designed to acquaint transportation students with the principles and practices of traffic management from both Governmental and commercial points of view. Emphasis on functions of a traffic department, both industrial and Governmental, and on relations between carriers and traffic departments, with a considerable portion of the emphasis placed on transportation law. *Prerequisite:* Transportation Rates, or experience with rates and tariffs, or permission of instructor.

#### 468. Transportation Problems of Agriculture

Fall, 3 credits

To be announced

Current policies and practical problems in transportation as it relates to agriculture. Historical background. Influence of transportation facilities and costs on the extent and nature of development of agricultural areas, and on the location of processing and storage operations; agricultural products and rate-making; current problems of rail, truck and water competition; regulated vs. unregulated motor carriers; and the effect of recent rapid increases in transportation costs on sources of supply and market areas for major farm products. *Prerequisite:* A course in principles of economics, and a basic course in agricultural economics.

#### 530. Methods of Price Analysis

Year, 2 credits each semester (alternate years)

RICHARD O. BEEN and ROBERT M. WALSH

A survey of the main price problems in agriculture and in marketing and consumption of farm products; a critical analysis of recent developments in economic theory and in statistical techniques and their use to measure the effects of various factors influencing prices; and a study of the accuracy and usefulness of price forecasts. Attention is given to Government price, production and marketing programs and to trade practices and market organization as they affect the prices of farm products at various stages in the marketing process. Emphasis is placed on developing proficiency in application of price analysis methods. *Prerequisite:* Principles of Economics, and Statistical Analysis of Economic Relationships or a course in statistics which included correlation analysis.

#### 716. Agricultural Policy in the Defense Period—Seminar

Fall, 2 credits

WALTER W. WILCOX, assisted by PHILLIP F. AYLESWORTH

Analysis and evaluation of current agricultural policy and programs with special emphasis on an evaluation of these programs in terms of national defense needs. Speakers in the lecture series, "Agricultural Policy in the Defense Period," and others will participate in seminar discussions. *Prerequisite:* An advanced degree in agriculture or a related field, or broad staff or operational responsibility in an agricultural program. Limited to 40 students.

Fall

1951

### Lectures on Agricultural Policy in the Defense Period

Major issues in agricultural policy raised by the defense program. Their solution as viewed by national leaders from farm organizations, labor, business and the Congress.

Lectures will be given at 4:00 PM in the Jefferson Memorial Auditorium on successive Mondays beginning October 1, 1951. A special announcement of the series including the speakers will be available in the late summer.

#### Committee

E. C. JOHNSON, *Chairman*

BUSHROD W. ALLIN

JAMES E. THIGPEN

PHILLIP F. AYLESWORTH

WALTER W. WILCOX

#### [719.] Resource Utilization Problems and Policies (1952-53 and alternate years)

Spring, 2 credits

V. WEBSTER JOHNSON and HORACE R. JOSEPHSON

#### [720.] Economics of Production (1952-53 and alternate years)

Spring, 3 credits

SHERMAN E. JOHNSON and ASSOCIATES

#### 721. Agricultural Finance—Seminar

Spring, 3 credits (alternate years)

NORMAN J. WALL and RUSSELL C. ENGBERG

A seminar dealing with the policies, programs and functions of private, quasi-public and public credit agencies; appraisal how adequately credit needs are being met; new developments in financing agricultural production and marketing. *Prerequisite:* Background of graduate work and approval of instructor.

#### 722. Marketing—Seminar

Spring, 2 credits (alternate years)

HARRY C. TRELOGAN

A seminar for advanced students professionally interested in the organization of markets and market agencies (firms) in relation to adequacy of service, efficiency and costs. Chief emphasis will be placed upon application of analytical methods of economics, accounting and statistics to important problems and policy questions in this field. Credit will be awarded on the basis of papers submitted on the special subjects approved at time of registration. *Prerequisite:* Registration upon instructor's approval of topic selected by the student for special study.

#### [750.] Farm Price Policy (1952-53 and alternate years)

Fall, 2 credits

ORIS V. WELLS

## COOPERATIVE EXTENSION EDUCATION

## COMMITTEE

CANNON C. HEARNE (Chairman)

LOA E. DAVIS

ARTHUR L. DEERING

D. BARTON DELOACH

ERWIN C. ELTING

DOUGLAS ENSMINGER

FRED C. JANS

PAUL E. NYSTROM

Cooperative extension education consists of the off-campus, non-resident teaching service of the land-grant institutions in cooperation with the USDA and the leadership of a county. It is the largest non-school educational program in the United States. The growing interest on the part of county agents, supervisors, specialists, and administrators in cooperative extension work as a profession has led the Graduate School to appoint a committee on Cooperative Extension Education. This committee has the responsibility for giving guidance to students toward a program best suited to the individual's needs, within the framework of the Graduate School. This program may well lead to an advanced degree depending upon the plans of the student and the cooperative arrangements available through the Graduate School. A separate leaflet is available describing the courses listed below, which will be given as the demand justifies, and showing also a general framework of courses of interest to cooperative extension people.

**450. Methods and Techniques**

2 credits

GLADYS G. GALLUP and OTHERS

**451. Extension Education for Foreign Students**

3 credits

FREDERICK P. FRUTCHEY

**596. Development of Programs**

2 credits

CANNON C. HEARNE

**535. Basic Evaluation, Research Methods and Techniques**

2 credits

LAUREL K. SABROSKY, FREDERICK P. FRUTCHEY and OTHERS

**620. Administration and Supervision**

2 credits

M. C. WILSON

**695. Problems in Cooperative Extension Education**

6 credits

CANNON C. HEARNE



## HUMAN RELATIONS

## COMMITTEE

CARL C. TAYLOR (Chairman)

GORDON T. BOWLES

DOUGLAS ENSMINGER

JOHN M. BREWSTER

FILLMORE SANFORD

IRENE B. TAEUBER

Courses in human relations are planned to meet the needs of four types of students: (1) those who wish a general rather than specialized knowledge of social problems and processes; (2) those who wish substantial first undergraduate courses in sociology, anthropology, and psychology; (3) those who wish specialized undergraduate and graduate courses in these same fields; and (4) mature persons who wish courses which use the knowledge of all social sciences in considering public issues and policy.

Introduction to the Study of Human Relations is designed to meet the needs of the first of these types of students. The American Tradition is representative of courses designed to meet the needs of the fourth class of students. Most of the other courses are standard college undergraduate and graduate courses in their respective fields.

Undergraduate students who have not had general orientation in the field of sociological sciences should enroll in Introduction to the Study of Human Relations so that, during the progress of the course, they may decide which of the specialized subject matter fields they care to pursue further. Most of the first courses in specialized fields of psychology, sociology, and anthropology are so placed as to give students who take this basic course the opportunity to pursue their specialized interests in a following semester.

Special attention is called to the courses offered in Population. They are designed to meet the needs of two groups: (1) those who wish a broad but nontechnical understanding of the significance of increasing population in relation to natural resources, occupational opportunities, social security, etc.; and (2) those who wish to develop a detailed understanding of the composition and dynamics of population and, among these, the ones who after taking the basic courses wish to take more advanced technical courses to prepare themselves for professional work in the field of population.

World Population Problems is designed to meet the first of these needs. The course has no prerequisite because it is assumed that it may be taken by either elementary or mature students in keeping with their desires to understand better the growing concern about population problems. All the other courses are designed to meet the needs of the second group. They form a sequence, as indicated by the prerequisites, and include both courses focused on

method and courses focused on content. The courses on population statistics, Courses 448, 449, and 700, are offered jointly by the Department of Social Sciences and the Department of Mathematics and Statistics.

### **050. Health and Medical Service Problems, Policies and Programs**

Fall, non-credit

MARGARET C. KLEM and HELEN JOHNSON

Bi-weekly discussions cover subjects in which the group indicates a special interest and may include such topics as development of local public health services, health planning on a community and minimum regional basis, proposals on child health in connection with the Mid-Century White House Conference on Children and Youth, present status of work and possible future developments under the Hospital Survey and Construction Act, rural health planning, and fundamental concepts in various health and medical programs. The seminar may continue during the spring term. *Prerequisite:* Consent of the leaders. No fee is charged; registration, however, is required and is limited to professional personnel in one or more fields mentioned.

### **055. Point 4 and Contemporary National Cultures**

Fall and Spring (non-credit)

M. L. WILSON and DOUGLAS ENSMINGER

A seminar designed to define different national cultures and to discuss how such knowledge is basic to effective bilateral and multilateral cooperation, with special attention to underdeveloped areas. The seminar is related to a lecture series (special lecture announcements will be issued) under the same title; visiting lecturers lead some discussions. Other sessions use the case method in analysis and discussion of current problems of program planning and administration, particularly in the technical assistance program.

Attendance at the seminar is by invitation and is limited to persons involved in program planning, policy making and administration of governmental and private programs. Registration is not required and no fees are charged.

### **105. Introduction to the Study of Human Relations**

Fall, 2 credits. Repeated in Spring and Summer

T. WILSON LONGMORE

A study of the contributions of the various social sciences, but especially sociology, psychology and anthropology, to an understanding of human behavior. An integrative course for students who have not had an opportunity to study any of the sociological sciences. Designed to acquaint students with techniques and principles used in describing and analyzing human relations. Should not be taken by students academically prepared to do advanced work in this field.

### **210. General Psychology**

Fall, 3 credits. Repeated in Spring

GEORGE W. ALBEE

A study of the basic patterns of human behavior, instincts, habits, ideas and attitudes. The course begins with a thoroughgoing analysis of the human nervous system and concludes with an analysis of personality.

### **215. General Sociology**

Spring, 3 credits

T. WILSON LONGMORE and ARTHUR F. RAPER

A basic and general study of social problems and processes with special emphasis upon such problems as population, race, poverty, crime, divorce, etc., and group processes such as organization, leadership, public opinion, etc.

## 220. Introduction to Cultural Anthropology

Spring, 3 credits

FORREST E. CLEMENTS

The origins of human culture, its historical development, language and culture, culture processes and principles of culture change. Stresses psychological factors in the acquisition and perpetuation of culture and analyzes human behavior as a resultant of innate and culturally acquired traits.

## 301. World Population Problems

Fall, 3 credits

DUDLEY KIRK

A general introduction, with emphasis on population problems and prospects in the United States. Training in use of United States and foreign census and vital statistics for the analysis of measurable human resources and social trends. Review of Malthusian and subsequent theories of population. Factors determining historic growth and distribution of the world's population. The current upsurge in population numbers. International and regional differences in the present balance of births and deaths. Economic, social, and resource factors in vital trends and prospects for growth. The impact of foreign aid programs on population trends in underdeveloped areas. Interpretation of population trends and prospects in the United States. Evaluation of population forecasts.

## 303. Child and Adolescent Psychology

Spring, 2 credits (alternate years)

LILY BRUNSCHWIG

Study of the development of human behavior from the prenatal period through adolescence in terms of the processes of physical, mental, emotional and social growth in the individual. Particular emphasis will be given to the interactions of the child's total personality.

## [304.] The Conditions of Personality Growth (1952-53 and alternate years)

Fall, 2 credits

LILY BRUNSCHWIG

## 325. Managing Personal Finances

Fall, 3 credits. Repeated in the Spring

HARALD G. LARSEN

The course has three main purposes: (1) to assist persons in planning the management of their finances to meet future needs; (2) to discuss principles which govern day by day financial decisions; (3) to acquaint students with the major financial instruments. Topics included are: building up of savings for such purposes as the education of children; plans for home ownership; fund for old age and retirement; renting versus owning a home; costs of home ownership; financing durable and other consumer goods; sources and costs of consumer credit and installment buying; life insurance and annuity contracts; protection versus savings; property liability and other insurance programs; planning and administration of estates; joint ownership; laws of intestacy; making a will; administration of estates as executor or administrator; proof of will, costs and fees; deeds, abstracts, mortgages, trusts, contracts, notes, stocks, bonds, debentures, and savings account; an introduction to the mathematical calculations needed in order to understand and use these instruments.

## 332. Contemporary National Cultures

Fall, 3 credits (alternate years)

GORDON T. BOWLES

Cultural backgrounds and behavior characteristics of different racial and national groups. Differences between these and American cultural and behavior patterns; phases in greatest conflict and likely to lead to misunderstanding. Use of cultural analysis in developing and administering international programs to the end that cultural conflicts can be recognized and identified. The course is adapted particularly to those concerned with developing and administering programs in foreign countries.



**400. Introduction to General Semantics**

Fall, 2 credits. Repeated in Spring

J. A. SAUNDERS

A study of this new methodology, the application of the investigative methods of the physical sciences, through extensional devices and techniques based on mathematical theory, to the social sciences, particularly individual and group relationships. Discussion of Korzybski's theories of human agreement, human progress, sanity and happiness. Applications of general semantics to case situations.

**421. Rural Sociology**

Fall, 3 credits

C. C. TAYLOR and ARTHUR F. RAPER

Designed for persons in other fields of specialty than sociology who are interested in the impact of social phenomena on the rural scene. Includes analysis of social, cultural, and psychological factors that influence or are a part of the agricultural economy: types of farming, buying and selling, rhythms of work and leisure, levels and standards of living; analysis of changes in social structure and modes of life resulting from population changes; increasing number, the location and levels of living of the rural non-farm population, problems of services, facilities and institutions in areas losing and areas gaining population, changing occupational employment of both rural non-farm and rural farm working force; and consideration of legislation and planning related to the above. *Prerequisite:* A college course in the social sciences.

**[426.] Urban Sociology (1952-53 and alternate years)**

Spring, 3 credits

ARTHUR F. RAPER

**433. Social Psychology**

Spring, 3 credits

DOUGLAS ENSMINGER

A general course on the social aspects of personality, social interaction and collective behavior. It includes treatments of cultural conditioning of personality, personality measurement, communication, public opinion, propaganda, censorship, mobs, riots, and social movements. An individual project is required for the third credit. *Prerequisite:* A course in general psychology or equivalent.

**[442.] Personality Disorders (1952-53 and alternate years)**

Spring, 2 credits

ALBERT C. CORNSWEET

**448. Population Statistics I: Basic Sources and Methods**

Fall, 3 credits

JACOB S. SIEGEL

Basic sources of population data in the United States. History of collection and quality of data. Basic methods of measuring and analyzing population size, geographic distribution, composition (age, sex, race) and population dynamics (natality, mortality, reproductivity, and migration). The decennial census. Basic demographic rates; including crude and refined rates. General methods (standardization, cohort analysis, interpolation, and graphics). Nature and use of life tables. Introduction to population estimates and forecasts. *Prerequisite:* An elementary course in statistics and one or more courses in the social sciences.

**449. Population Statistics II: Intermediate Methods and Applications**

Spring, 3 credits

MARGARET JARMAN HAGOOD

Statistics I, with more advanced techniques and specialized topics. Marriage and Divorce. Population Composition (marital status, educational status, economic characteristics, etc.). Family statistics. Advanced analysis of mortality, natality, reproductivity, and migration; measures based on life tables. Construction of life tables. Population estimates and projections, including specialized types (families, labor force, school enrollment). Analysis of population compo-



sition and dynamics in relation to other factors. Practical applications of methods in social and economic research, market research, and government planning. *Prerequisite:* Population Statistics I.

#### **458. Manpower and Labor Force Analysis**

Spring, 3 credits (alternate years)

HAROLD WOOL

Study of the size, composition, and changing characteristics of the labor force and manpower. Working force theory and concepts of labor force and manpower. Problems of measurement of employment and unemployment levels and the interpretation of such statistics. Occupational, industrial, and class of worker composition and changes. Problems of geographic and occupational mobility in the light of factors facilitating or impeding mobility. The demographic socio-economic, and technological factors bringing about labor force and manpower changes. *Prerequisite:* Population Statistics I.

#### **465. The American Tradition**

Spring, 3 credits

JOHN M. BREWSTER

The development of Western Society has imparted to our American heritage at least three distinct types of life and corresponding forms of society. These types may be designated as the (1) aristocratic (dictatorial) view, (2) the middle-class view which, in America, finally developed into (3) the ideal of the self-made man. This course analyzes leading ideas in each of these views, giving particular attention to the conditions under which they arose, in a manner useful to those seeking better understanding of current problems, both domestic and foreign.

#### **470. Applications in General Semantics**

Year, 1 credit each semester \*

J. A. SAUNDERS

Designed for advanced students of General Semantics who desire more experience in applying the principles, techniques and devices of this new discipline to the solution of personal, professional, community and national problems. Members of the group will work on problems of their own choosing. Persons who select similar problems will be organized into sub-groups. Each individual or group, by the second meeting, will be expected to have presented an outline of its project to the director for his approval. Each individual or group will be expected to prepare at least one paper or "report" for discussion and evaluation by the class. Credit will be awarded on the basis of written reports on student projects suitable for general distribution. Audit students will participate in all activities of the group but need not submit reports for general distribution. *Prerequisite:* Completion of a course in General Semantics or equivalent, or permission of the instructor.

\* Students may attend both or either semesters.

#### **515. Sociology and Psychology of Group and Community Relations**

Fall, 3 credits

DOUGLAS ENSMINGER and CARL C. TAYLOR

A study of community organization and action, of group processes and functions, with special reference to problems which confront agricultural extension workers, health, welfare and church leaders, and general farm organizations; a study of leadership as a function of group formation and action, with special reference to group dynamics. *Prerequisite:* Approval of instructor.

#### **[516.] The Cultural Regions of the United States (1952-53 and alternate years)**

Spring, 3 credits

CARL C. TAYLOR and ARTHUR F. RAPER

#### **[700.] Population Statistics III: Advanced Analytical Methods (1952-53 and alternate years)**

MARGARET J. HAGOOD

## HISTORY AND INTERNATIONAL RELATIONS

## COMMITTEE

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FRANCIS O. WILCOX

The perspective of history throws light on the question: "How have we come to where we are?" It cannot answer the question: "Where are we going from here?" But it is a guide to the possible routes.

Today it is essential that the citizen keep abreast of the wide range of the relations that exist between his country and other countries, between his people and other peoples, and the new conditions that govern those relations. Two world wars, having immediate causes in areas and among peoples remote from the ordinary occupations and tensions of American life, definitely and perhaps irretrievably have involved the United States in world affairs and relationships far beyond any experience in its past.

On the political side, world power has shown the tendency to become more or less polarized between two Great Powers, the United States and the Union of Soviet Socialist Republics. Profound changes, of which the results cannot be foreseen, are taking place in the political alignments of many nations. Cultural interests, economic relations, and political security are all being changed and reshaped. New technical advances are part of the driving forces making for change. New techniques in the handling of foreign relations are being developed. Beside old methods of bilateral negotiation for the settling of international problems, the machinery of the United Nations, designed to deal with a wide range of world conditions, has been established.

Security, spiritual, material, and political, was at the very foundation and purpose of government and human social organizations from the time nations took form up to our own times. But the conditions of security are changing. The notion of security as something bounded by physical frontiers is perhaps changing most of all. Ideas spread from mind to mind throughout the free world; and, at least on a one way basis, between the free and the closed world. The instruments of mass communication, like the radio, impose on governments new problems of public relations in the international sphere. One result has been the setting up of a new section of the State Department to deal with such matters as public opinion at home and abroad, broadcasting and films, and other aspects of cultural relations between peoples.

Public lectures and courses in this area are designed to give the student some opportunity for (1) acquainting himself with the new techniques and approaches to international relations; (2) acquiring insight into basic materials, causal factors and historical backgrounds that determine the main current trends in international relations; and (3) getting a deeper knowledge of some of the main world problems and their impact on particular regions and countries.

## 250. American History to 1865

Fall, 3 credits

WAYNE D. RASMUSSEN

A survey of the political, social, economic, and cultural forces, prior to 1865, which have contributed to the development of American civilization. Includes a summary of the colonial period; the political, economic, and diplomatic factors of the American Revolution; and the development of national life and institutions.

## 251. American History since 1865

Spring, 3 credits

WAYNE D. RASMUSSEN

A survey of the political, social, economic, and cultural forces which, since 1865, have contributed to the development of present-day American civilization. Includes the frontier movement and immigration; constitutional growth and changes in world relations; and economic change and development.

## 324. International Relations

Fall, 3 credits

REUBEN H. GROSS, JR.

An introductory course dealing with the nature and problems of the state in the modern world community; foundations of its power, influences upon its policy, and the character of its procedures. Diplomacy, nationalism, imperialism, international organization and other problems will be discussed.

## 407. History of Agricultural Policy in the United States

(See p. 81)

## 428. The Struggle for Peace—Current World Problems

Summer, 2 credits

PETER BERGER

Structure of state system; nationality; sovereignty as the maximum area of agreement. "We the peoples of the United Nations." Conditions of peace and causes of war (conflicts of will, interests and ideas; desires for things incompatible with peace; political, economic and ideological aggressions; insecurity, etc.). State and private struggle for power on the economic plane. Raw materials, population, agriculture and food. Diplomacy; military organization; ideological manipulations (political and psychological warfare by use of channels of communications, such as speech, press, radio, etc.); attempts to maintain peace and reasons for failure. Facilitating international cooperation, political, economic, cultural; and mitigating conflict by means of international institutions, public and private.

## 436. European Diplomatic History, 1848 to the Present

Spring, 3 credits

REUBEN H. GROSS, JR.

Provides essential background for understanding the problems of foreign policy which confront the United States today as the leader of the free world. Includes an analysis of the rise of *real-politik* nationalism and of the conduct of

diplomacy under this system; the causes and results of the two World Wars; the growth of the idea and practice of international action; an evaluation of the lessons from the past century of European diplomacy which are pertinent for the United States in assuming its new responsibilities as a world power.

#### **452. Modern Russia I and II**

Fall, 3 credits

V. J. TERESHTENKO

An overall survey of the organization and functioning of the Soviet economic and social system with emphasis on later developments, rather than on the past. Political foundation of the Soviet system; the constitution; organization of the government and the communist party. Population and psychological characteristics of the Soviet people. The planning system. Collective agriculture and organization of industry. Five-year plans. Financial and trade systems. Cooperatives. Trade Unions. Social insurance and system of medical care. Organization of education and cultural life. Includes Course No. 453, "Modern Russia—Current Problems."

#### **453. Modern Russia II—Current Problems**

Fall, 1 credit

V. J. TERESHTENKO

An analysis of the recent developments in the Soviet economic and social life. Impact of the war. Post-war reconstruction; activities of the UNRRA in the USSR. Development of Soviet Central Asia, Far East and Far North. North Sea Route. New trends in the collective agriculture. Polar agriculture. Afforestation project. New railroads and canals. Tasks of the current Five-Year Plan. Monetary reform. "Molotov Plan" versus "Marshall Plan." *Prerequisite:* Open only to students who have taken the course no. 430, "Modern Russia" in previous years.

#### **465. The American Tradition**

(See p. 89)

#### **525. The Application of Psychoanalytic Theory and Methods to Problems of International Relations**

Year, 2 credits each semester (alternate years)

H. M. SPITZER

The first semester is devoted to fundamental concepts of psychoanalysis (structure of the psyche, instincts and their development, typical mechanisms) and methods of psychoanalytical research. The second semester deals with applications of these methods to problems, mainly in the field of international relations, such as national character, propaganda, attitudes toward other nations.

The first part of the course consists of lectures and discussions; students receive a selected reading list to assist them in following the course. The second part is in seminar form; students prepare papers based on their own experience, and submit reviews of two books in this field. *Prerequisite:* Psychology of International Politics, or major in psychology or history, or equivalent experience approved by instructor. Course may be entered second semester with instructor's consent.

#### **745. The United States and International Organizations**

Spring, 3 credits

HOWARD B. CALDERWOOD and SPECIALISTS

Critical analysis and evaluation of relationships between the United States and international organizations—purposes, interests, machinery. Approached in terms of current problems. Discussions led by guest specialists. *Prerequisite:* An undergraduate degree in one of the social sciences, or responsible experience in international field, or consent of instructor.



**817. The British Commonwealth and the United States**

Fall, 3 credits

H. DUNCAN HALL

The growth and nature of the British Commonwealth, its functioning as a power in world affairs, and relations between the United States and the Commonwealth and the countries within the Commonwealth. The significance of the Commonwealth for the economic and defense policies of the United States.

Includes a study of the development of Great Britain itself and the older Dominions, the expansion of the Commonwealth into Asia, the addition of its newer members—India, Pakistan, and Ceylon, and the expansion into Africa and the Caribbean.

**820. American Foreign Relations, Policies and Practices**

Spring, 3 credits

NELSON TRUSLER JOHNSON

Fundamental principles as developed in the conduct of our foreign relations from the Declaration of Independence up to the close of the free immigration period in 1925; significant subsequent developments through and following World War II, requiring us to accept and meet the responsibilities which go with our position among the nations.

United States Government organization for conducting its business with other governments. Factors which have played major roles in the development of foreign policy: commerce, international finance, shipping, fishing, agriculture, etc.; public opinion and the influence of media of mass communication; minority and pressure groups; etc. Implementation of foreign policy in peace and war, choice of people and machinery; informing other peoples about ourselves and how best to accomplish it. Need for effective coordination of our governmental machinery so as to identify and harmonize the needs and convictions of the whole American people in a united common action for the achievement of their ideals. Present methods of coordination. Other possible methods, including the Secretariat system. *Prerequisite:* Graduate study in the social sciences, or responsible administrative or supervisory experience, or approval of instructor.

# Technology

## DEPARTMENTAL COMMITTEE

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R. G. HAINSWORTH

H. E. HILTS

E. J. STOCKING

E. J. UTZ

EDGAR F. VANDIVERE

MARSHALL S. WRIGHT

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Various departments and agencies of the Federal Government are engaged in extensive programs designed to conserve the Nation's natural resources and to raise the standards of living of urban and rural populations. These programs include such projects as flood control, soil conservation, power development, mapping, rural electrification, industrial hygiene, housing, and a large number of related activities. All these projects involve in varying degrees engineering techniques and professional engineers, and include many functions requiring that this personnel have an intimate, working knowledge of techniques not provided in the standard engineering and related technological courses.

Basically, education in engineering schools is limited by necessity and tradition to a period of four or five years. This short period of training provides sufficient time to assimilate and master only a minimum of the basic sciences. There is little time available for courses which will give the technical student an understanding of the social and economic problems of the world about him. As a result, he fails often to appreciate the impact upon society of the advances of his profession. Moreover, technological techniques and practices are never static and developments in the sciences and in engineering require enlarging and constant reorienting of the engineer's technical background.

Mindful of the limitations of engineering education, of the engineer's place in modern society, and of the need for providing opportunity for additional study, the Graduate School, working with representatives of the various Government departments and agencies and of the local chapters of engineering societies, offers courses designed to add to the technical, administrative and professional background of engineers in the service of the Federal Government. Many courses offered also give an intimate working knowledge of the latest techniques that colleges and technical institutes often cannot provide.

The Department of Technology offers a number of courses in those skills, basic to engineering operations, which will be of assistance to the engineer, the applied scientist, and the non-engineer

desiring to broaden his background, to increase his efficiency, and to develop his professional capacity.

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## ENGINEERING

### COMMITTEE

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HARRY SAWCHUCK

J. P. SCHAEZNER

F. F. SNYDER

E. J. UTZ

JOHN A. WEBER

### 110. Principles of Electricity

Spring, 2 credits

DAVID ASKEGAARD

Principles of electricity, emphasizing alternating currents. Covers basic units such as voltage, current and power and their measurement, resistance, voltage regulation, line loss, power factor, three phase systems, etc. The function of equipment used on rural electric distribution systems such as generators, substations, transformers, lightning arrestors, fuses, oil circuit reclosers, etc., will be emphasized.

### 115. Practical Electronics

Fall, 2 credits

MILTON SANDERS

Basic characteristics of resistance, capacitance, and inductance taken singly and in combination; elementary circuit analysis, particularly as it pertains to series and parallel resonance; active circuit element descriptions including diodes, triodes, and pentodes; the processes of amplification, modulation, and detection; practical circuits in detail, such as voltmeters, oscillators, oscilloscopes, radio and television sets. The course stresses how electronic circuits work and is substantially non-mathematical using only algebraic concepts and a few simple complex notations. *Prerequisite:* General knowledge of physics and electricity.

### 310. Aerodynamics

Year, 2 credits each semester (alternate years)

MAURICE E. LONG

First semester: Fluid flow, wing theory, airfoil characteristics, wind-tunnel tests, stability, drag data. Lectures, discussions, and problems.

Second semester: Engine and propeller considerations, performance calculations, special problems. *Prerequisite:* College physics, algebra, trigonometry, and analytic geometry.

### [402.] Principles and Practice of Refrigeration (1952-53 and alternate years)

Fall, 2 credits

HARRY L. GARVER

### 405. Principles of Specifications

Fall, 2 credits

BENJAMIN ROSENZWEIG

A basic course in the principles underlying the government specifications systems. A brief survey will be made of procurement documents and the purposes they serve. The organization of specifications for form, clarity, and effectiveness will be demonstrated. The evolution and ramifications of specifications will be considered with regard to research and development; legal and contractual relations; proprietary items; and government inspection. The divi-

sion of specifications into performance and formulation types will be reviewed. The problems of standardization and industry coordination will be discussed. *Prerequisite:* Knowledge of procurement, inspection, research and development processes, or specification writing.

### **501. Transmission and Distribution Systems for Area Electrification**

Fall, 3 credits

EDWARD P. EARDLEY

Study of electrical and mechanical characteristics of lines used in the transmission and distribution of power; the operation of such systems; the economic principles on which design rests. *Prerequisite:* Degree in engineering or equivalent experience.

### **510. Analysis of Statically Indeterminate Structures**

Year, 2 credits each semester (alternate years)

ALFRED W. FISCHER

The first semester covers the review of the fundamental slope deflection equations and the moment distribution method. Subjects will include: rectangular frames; complex three column bent and Vierendeel truss with parallel top and bottom chords by the superposition method; general equation of flexural stress; an asymmetrical section unsymmetrically loaded; miscellaneous problems; review.

The second semester covers the column analogy method and the fundamentals of least work. Subjects will include: simple bents; unsymmetrical arch; fixed end moments; stiffness factor, carry over factors, and fixed end moments for an unsymmetrical curved member with varying moment of inertia; secondary stresses; miscellaneous problems; review. *Prerequisite:* Degree in civil engineering or equivalent.

### **520. Theory and Design of Welded Structures**

Spring, 2 credits (alternate years)

NATHAN W. MORGAN

Topics to be treated: fundamentals of metallurgy; weldability and processes generally applicable to the welding of ferrous metals; basic symbols, definitions and specifications; a study of welding training, qualification, inspection and safety rules; a summary of recent tests of welded specimens, static, inspect, and fatigue; a survey of welding difficulties and failures; welded structures and experiences; and actual design problems and details. One or more recent films will be shown. *Prerequisite:* College degree in engineering or equivalent experience, including a general knowledge of the computation of stresses in structures.

### **[542.] Mechanical Vibrations (1952-53 and alternate years)**

Year, 2 credits each semester

J. SAMUEL SMART

### **[552.] Recent Developments in Materials Engineering (1952-53 and alternate years)**

Spring, 2 credits DANIEL KLATZKO, WILEY C. SMITH and COMMODITY EXPERTS

### **[553.] Engineering in Materials Supply Operations**

WILLIS S. MACLEOD

### **554. Protecting Engineering and Scientific Developments Through Patents**

Spring, 2 credits (alternate years)

ALBERT J. KRAMER

Gives engineers and scientists practical information about inventions and patents. Beginning with a discussion of the need of patent protection in our



competitive economy, the course will cover: a review of the United States patent system; the steps that an inventor should take to protect his invention; analyses of some important historical patents; how to interpret patents for novelty and infringement; how patents, trade marks, and copyrights are distinguished; what rights employees and employers have to inventions made by the employees; how patent rights may be dealt with; how to determine inventorship among co-workers; how to determine patent priorities between independent inventors; the elements of inventive intelligence; and other matters of particular importance to engineers and scientists, especially those in the Government service. *Prerequisite:* Degree in one of the sciences, or equivalent, or consent of the instructor.

## 560. Fundamentals of Telephony

Fall, 2 credits

ROBERT S. NEIKIRK

An introduction to the principles of telephony with special emphasis on rural telephone systems. Covers basic telephone transmission theory, central office switching methods, central office auxiliary equipment, fundamental circuit analysis, toll switching methods, rural carrier systems and outside plant practices. Special lectures will be given by engineers from industry and Government who are specialists in the various phases of the telephone field. *Prerequisite:* Degree in engineering or equivalent, or permission of instructor.

## [700.] Analysis of Rigid Frames (1952-53 and alternate years)

Year, 2 credits each semester

A. AMIRIKIAN

## [702.] Electric Utility Engineering (1952-53 and alternate years)

Year, 2 credits each semester

J. J. A. JESSEL and ALMON D. THOMAS

## SURVEYING AND MAPPING

### COMMITTEE

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J. E. KING  
GUILLERMO MEDINA  
ALBERT L. NOWICKI

HOWARD S. RAPPLEYE  
A. L. SHALOWITZ  
G. C. TEWINKEL  
PAUL D. THOMAS  
H. W. WHITLOCK  
ARCHER M. WILSON

Maps have played an important part in human progress. Today, as never before, they furnish the basis for both military and non-military activities throughout the world. Greater use of maps has brought increasing demand for persons qualified in each of the technical phases of map production and reproduction.

The purpose of the curriculum in surveying and mapping is to offer basic training for those persons who are engaged in the technical and supervisory aspects of map making. The curriculum is intended to give the student a broad knowledge and basic understanding of each of the separate phases of the science; to enable him to understand better the problems, possibilities, and limitations of each of the phases. He can then better plan his own activities toward the economical production of accurate maps. A

large part of the curriculum is devoted to geodesy, a subject considered to be of increasing importance in view of modern rapid means of world-wide travel, the consequent need for world-wide charts, and the development of new methods in surveying.

At least two years' work toward a degree of Bachelor of Science in Civil Engineering is considered as being the logical background for the curriculum in surveying and mapping, although one who has completed the sophomore year in engineering normally would have fulfilled the usual prerequisites. Many other potential students will also find that they may have already fulfilled all or nearly all the prerequisite studies. It should be emphasized that Calculus and College Physics are desirable prerequisites for advanced courses. Persons who are planning a career in this field are urged to arrange their schedules so as to include these courses at the earliest opportunity.

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### *Surveying*

#### **135. Elementary Surveying**

Fall, 3 credits (every third year)    HOWARD S. RAPPLEYE and ERNEST J. PARKIN

Use of the transit, level, compass and accessory equipment; adjustment of instruments; field methods of transit-and-tape traverse and engineers' leveling (differential and profile); computations connected with above including adjustment of traverses by compass and transit rules, computation of latitudes, departures, and areas. Lectures, classroom work, and field work. *Prerequisite:* Plane trigonometry.

#### **[215.] Route Surveying (1953-54 and every third year)**

Fall, 3 credits    HOWARD S. RAPPLEYE and ERNEST J. PARKIN

#### **[216.] Ground Methods of Topographic Surveying (1953-54 and every third year)**

Spring, 3 credits    HOWARD S. RAPPLEYE and ERNEST J. PARKIN

#### **217. Astronomy for Engineers**

Spring, 3 credits (every third year)    HOWARD S. RAPPLEYE and ERNEST J. PARKIN

The fundamentals of the circular systems; basis of the determination of time, longitude, latitude and azimuth; the use of instrumental equipment such as altazimuth instrument, zenith telescope, meridian transit, sextant, astrolabe, zenith camera. Lectures, classroom work and field work. *Prerequisite:* Ground Methods of Topographic Surveying or equivalent or permission of the instructor.

#### **[218.] Geodetic Surveying (1952-53 and every third year)**

Fall, 3 credits    HOWARD S. RAPPLEYE and ERNEST J. PARKIN

#### **[219.] Computation and Adjustment of Geodetic Observations (1952-53 and every third year)**

Spring, 3 credits    HOWARD S. RAPPLEYE and ERNEST J. PARKIN

## Photogrammetry

### 120. Introduction to Photogrammetry

Fall, 2 credits

RANDALL D. ESTEN

Lectures and demonstrations in non-technical terms cover: the history and development of photogrammetric engineering; the importance of optics; basic principles of photography; types of aerial photography, aerial cameras, accessory equipment, and photographic aircraft; requirements of coverage, flight lines, tilt, and scale; photo interpretation and stereoscopes; requirements of horizontal and vertical control; radial plot and stereoscopic plotting instruments. Designed for persons who use aerial photographs in military planning and operations, highway development, agricultural land use and conservation, mineral and petroleum exploration, and in other engineering and industrial operations.

### 208. Aerial Photographic Interpretation

Fall, 3 credits

ETHAN D. CHURCHILL

Principles, techniques and applications of aerial photographic interpretation; history, concepts, types of aerial photographs, principles, techniques, and applications. Study, and use in various fields, of aerial photographs as a source of detailed natural and cultural information. *Prerequisite:* A general background in one of the following fields: surveying and mapping, cartography, geography, geology, forestry, agriculture, architecture, or allied engineering fields.

### 212. Photogrammetry I

Fall, 2 credits

W. S. HIGGINSON

Basic optics; basic geometric characteristics of aerial photographs; flight planning; basic photography and laboratory practices; photographic materials; aerial cameras; camera mounts. *Prerequisite:* College plane trigonometry.

### 213. Photogrammetry II

Spring, 2 credits

W. S. HIGGINSON

Radial line plotting methods, mosaics, determination of elevations from photographs, photo-interpretation. *Prerequisite:* College plane trigonometry.

### 370. Photogrammetry III

Fall, 2 credits (alternate years)

G. C. TEWINKEL and BERNARD J. COLNER

Geometry of the tilted photograph, the oblique, and the horizontal; introduction to tilt determination and analytic computations; practice with the multiplex. *Prerequisite:* Photogrammetry I and II.

### 371. Photogrammetry IV

Spring, 2. credits (alternate years)

G. C. TEWINKEL and BERNARD J. COLNER

Practice with multiplex; stereoscopic plotting instruments; rectification; the use of horizontal and oblique photographs; the photo alidade. *Prerequisite:* Photogrammetry III.

## Cartography

### 125. Introduction to Cartography

Spring, 2 credits

STEPHEN M. JOHNSON

This course will introduce the student to the field of cartography and the problems that are involved in the compilation, production, and uses of maps. Subjects included are: history of maps; the geographic framework of maps; the

significance of map scale; descriptions of the various methods of mapping; reading the map content; map programs of the various Federal agencies; map research problems; and general extent of mapping throughout the world.

## 222. Cartography I—Technical Elements

Fall, 2 credits

GEORGE H. EVERETT

The geographic coordinate system and the basis for its dimensions; the use of the system in expressing relative location; determination of relative location by plane surveying; the interpretation of distance and direction in various types of maps; relating plane surveys to the spheroidal surface; geographic position computation; distance and azimuth computation; the substitution of a plane coordinate system for expressing relative location; use of lines of position; use of charts for position determination. *Prerequisite:* College plane trigonometry.

## 223. Cartography II—Map Projections and Grid Systems

Spring, 2 credits

EDWARD W. FONFARA

Includes: basic principles with practical applications; computations; use of tables; layout; definitions; classifications; and characteristics. Identification of such standard projections as the polyconic, mercator, transverse mercator, Lambert conformal, gnomonic, and stereographic; and coordinate systems including rectangular, broad-area and true military grid.

This subject is presented from the practical viewpoint without the complex variable theory applications. *Prerequisite:* College plane trigonometry.

## 224. Cartography III—Large Scale Maps

Fall, 2 credits (alternate years)

JACOB SKOP

Includes a review of the fundamental principles of cartography and the application of these principles with emphasis on large scale maps. Specific topics include: types and scales of maps; classification of the earth's features and their interpretation in symbolization; names; drainage, relief, woodland and vegetation, and other cultural features; foreshore and offshore hydrography; public land surveys; methods and procedures for making large scale maps; pre-compilation preparation; aerial photography; horizontal and vertical control; classification surveys; the compiler and his work; compilation; editing and field checking; color separation drafting; photolithographic reproduction; and military grids. *Prerequisite:* Cartography I and II or equivalent.

## 225. Cartography IV—Small Scale Maps

Spring, 2 credits (alternate years)

MARCUS A. ROSENBAUM

Factors to be considered in selecting the projection for the map, the scale, and the material for the compilation; drawing the map and preparing it for reproduction; compilation, reproduction, and use of the Army Map Service series of maps: the Nautical Chart Series including their compilation, reproduction and application to navigation; the Aeronautical Chart Series including their compilation, reproduction, and application to air navigation. *Prerequisite:* Cartography I and II or equivalent.

## 240. Methods of Map Reproduction

Spring, 2 credits

M. S. A. DELANEY and SPECIALISTS

Photography including wet plate, dry plate and film; photostat, ozalid, blue-print, etc.; process plate making including plastics; negative engraving and lithographic drafting; transferring; type composition for maps; copper plate engraving and plate printing; presswork, single and multicolor; layout and film assembly; inks and papers; binding and finishing. Lectures by lithographic experts from government and industry.



**[430.] Theory of Map Projections (1952-53 and alternate years)**

Fall, 2 credits

JOHN A. O'KEEFE

**440. Theory of Geodesy**

Year, 3 credits each semester (alternate years)

ALFRED D. SOLLINS

Review of essential mathematics. The figure of the earth, the geoid, the spheroid, properties of the spheroid, elliptic sections (plane sections containing the center of the spheroid), the geodesic or geodetic line, other notable curves as the loxodrome, the curve of the alignment; spherical and spheroidal triangles, spherical excess, Legendre's theorem and its extension; derivation of formulas for latitude, longitude and azimuth; long lines on the spheroid, the direct and inverse problem; determination of the constants (the ellipticity and axes) of the spheroid by arc measurement, area measurement, gravity measurements; conformal projections used for geodetic computations, the transverse mercator, the Lambert conformal conic; plane coordinates and machine computation of geographic positions based on projections; innovations in geodetic surveying, trilateration by Shoran, Loran, Decca, pulsed light methods, and geodetic datum connections by means of flare triangulation, solar eclipses and star occultations. *Prerequisite:* Calculus and courses in advanced surveying.

**FINE ARTS AND ARCHITECTURE***Fine Arts***320. Water Color Painting**

Fall, 2 credits. Repeated in Spring and Summer

ROWLAND LYON

Theory and practice; painting from landscape and still life.

**321. Sketching and Freehand Drawing**

Fall, 2 credits. Repeated in Spring and Summer

GLADYS MILLIGAN

Study of shade, shadows, and perspective. An intensive study of theory, harmony of lines, and pictorial and outdoor sketching. Each student receives individual criticism. Open to both beginners and advanced students.

**322. Survey of Art**

Fall, 2 credits

CHARLES M. RICHARDS

The course is designed to establish the basic values which underlie artistic achievement and to develop an appreciation of these values before the objects themselves. From age to age these basic values—the aesthetic values—remain the same. The lectures will attempt to relate the major epochs to one another so as to indicate the continuity of art history and at the same time contrast the variant forces and ideas which produced such differing styles and expressions.

**323. Portrait Painting in Oil**

Fall, 2 credits. Repeated in Spring and Summer

PIETRO LAZZARI

To enjoy this course the student need not have experience as an artist but must have the desire to achieve proficiency in portraiture.

Professional methods of painting oil portraits incorporating the basic techniques of the old masters and the spirit of modern art. Course includes, sketching, line composition and light arrangement; color, theory and technique of painting in oil. All work done from life.

### 334. Modern Painting

Spring, 2 credits

CHARLES M. RICHARDS

This course begins with a study of the art of the outstanding masters of the 17th Century and of the general current of painting in that century, with emphasis on the development of painting through the National Schools and styles up to the present moment. The main concern will be to arrive at an understanding and appreciation of impressionism and post-impressionism.

## *Architecture*

### 305. Elements of Statistical Drafting

Year, 2 credits each semester

NELSON P. GUIDRY

A practical course in drafting involving actual preparation of statistical maps and charts in class. Explanations of short cut methods of lettering technique and arrangement of component parts of illustrations. Complete illustrations will be prepared in ink ready for publication. The reduction, reproduction, and color application to statistical maps and charts will be explained.

### 316. Landscape Design—Small Property

Fall, 2 credits

JOSEPH C. GARDNER

The purpose of this course is to encourage and direct the creative impulse of the person interested in the landscape development of the small property, thus creating more interest and pleasure in the home. The course will include an outline of the basic principles of land planning and their application to the design of the small property, with discussion of the principles of composition in relation to the selection and use of plants and other materials. The practical application of landscape design principles to specific problems. A discussion of the physical aspects of landscape development including construction methods, horticultural standards and maintenance requirements. Each member of the class will be required to submit a statement concerning his program for the plan and development of his property or property of his selection.

### 324. Basic Mechanical Drawing I

Fall, 2 credits

LEO G. D. WIEMER

The use of drawing instruments. Lettering and dimensioning. Problems in conventional presentation of objects by means of lines, including geometrical problems, orthographic projection and auxiliary projection. One hour lecture and three hours drafting room work each week.

### 325. Basic Mechanical Drawing II

Spring, 2 credits

LEO G. D. WIEMER

Advanced instruction in the elements taught in Basic Mechanical Drawing I. Developments and intersections. One hour lecture and three hours drafting room work each week. *Prerequisite:* Basic Mechanical Drawing I or equivalent.

### 340. Architectural Drafting I

Fall, 2 credits

LEO G. D. WIEMER

Frame house construction. Study of wood framing and related building materials; arrangement of rooms and furniture; the economy of good construction. Drawing of plans and elevations of a frame residence from sketches. One hour lecture and three hours drafting room work each week. *Prerequisite:* Basic Mechanical Drawing II or equivalent.

**341. Architectural Drafting II**

Spring, 2 credits

LEO G. D. WIEMER

Large scale drawing of exterior and interior details for the frame residence studied in Architectural Drafting I. One hour lecture and discussion and three hours drafting room work each week. *Prerequisite:* Architectural Drafting I or equivalent.

**342. Architectural Drafting III**

Fall, 2 credits

LEO G. D. WIEMER

Study of masonry construction and related building materials. Site plan study and drawing. Preparation of plans and elevations of a masonry building from sketches. One hour lecture and discussion and three hours drafting room work each week. *Prerequisite:* Architectural Drafting II or equivalent.

**343. Architectural Drafting IV**

Spring, 2 credits

LEO G. D. WIEMER

Large scale drawing of exterior and interior details for the masonry building studied in Architectural Drafting III. Outline study of the Orders of Architecture. One hour lecture and discussion and three hours drafting room work each week. *Prerequisite:* Architectural Drafting III or equivalent.

**TECHNICAL ARTS**

## COMMITTEE

R. G. HAINSWORTH (Chairman)

SADYE F. ADELSON  
EDWARD S. COBBDOROTHY NICKERSON  
ELBRIDGE C. PURDY

MARY A. ROKAHR

**188. Glass Blowing**

Year, 2 credits each semester

L. B. CLARK, SR.  
L. B. CLARK, JR.

A laboratory course for technicians. Simple manipulation of joining, bending, and shaping is carried through to the production of useful apparatus. Metal in glass and glass to metal seals of all types are made. During the first semester the soft glasses are utilized for practice; during the second semester the related glasses are used. Ample opportunity for advanced work is given those who show themselves particularly adapted to the work. (New students may be admitted in the Spring if space permits.)

**230. Home Furnishings I—Color and Design**

Fall, 2 credits

MARTHA L. HENSLEY

A limited study of: (a) the basic elements of color, hue, and texture and how they are used in the selection of wall and floor surfaces, household textiles, furniture, and accessories; (b) the fiber, weaves and finish of household textiles used for curtains, slip covers, upholstery; (c) the arrangement of furniture and accessories to create a comfortable room to live in.

**231. Home Furnishings II—Textiles and Furniture**

Spring, 2 credits

MARTHA L. HENSLEY

A survey of historical textiles and period and contemporary furniture.

**234. Modern Homemaking for Employed Men and Women**

Fall, 2 credits

SADYE ADELSON and SPECIALISTS

Specialists, in a series of popular lectures, will give up-to-the-minute practical information on homemaking for the busy family. Topics covered will include: family financial planning; menu planning; buying food; selecting the home; functional house planning; selecting and arranging home furnishings; selecting and storing household equipment; managing the work in the home; selecting clothing to suit pocketbook, wearer, and function; care of clothing; family cooperation; and child guidance.

**260. Introduction to Modern Color Technology**

Fall, 2 credits

JOSEPHINE G. BRENNAN

An introduction to the basic phenomena, laws, and characteristics of color. The course is designed for persons concerned with color, whether as an artist, photographer, illuminating engineer, information or extension specialist, or specialist in other technical fields. Topics to be studied, in the review of the physical, physiological, and psychological aspects of color, include: appearance characteristics of color and methods of specification of those characteristics; the psychological attributes and phenomena of color; the physical properties and the production of color and color mixtures, including light sources and filters; and color vision and types of color vision deficiencies. Examples of the application of this information to actual work problems will be presented throughout the course.

**[262.] Color Technology—Physical Aspects****PHOTOGRAPHY****COMMITTEE****R. G. HAINSWORTH (Chairman)****EDWARD S. COBB****RAYMOND DAVIS****WILLIAM J. FORSYTHE****R. J. LEFEBVRE****KEITH B. LEWIS****ALBERT R. MATERAZZI****HOWLAND PIKE****ELBRIDGE C. PURDY****ROY M. REEVE****70. Survey of Photography**

Fall, non-credit. Repeated in Spring and Summer

**WILLIAM C. MCHENRY**

This is a lecture, demonstration course of a non-technical nature. It is intended particularly for those camera enthusiasts who desire a clearer understanding of how their cameras, films and prints work. Better pictures should be the result of taking this course. Topics covered: camera types and operation; film types and uses; developing and printing; filters; exposure; planning, composition and lighting; portraiture; motion pictures; color photography. Exhibition and demonstration of equipment, materials and techniques supplement class lectures and discussion.

**80. Survey of Motion Picture Photography**

Fall, non-credit

**LANCE G. HOOKS**

A non-technical lecture-demonstration course designed especially for amateur movie makers. Covers the fundamental techniques of making color and black and white personal motion pictures. Topics include: camera sizes, types and operation; film types and uses; lenses; filters; planning; continuity; composition; lighting; exposure; editing; titling and projection. Exhibition and demonstration of equipment, materials, techniques supplement class lectures and discussion.



## 192. Fundamentals of Photography I

Fall, 2 credits. Repeated in Spring

EDWARD S. COBB

Forms a foundation for all of the more advanced courses in photography. Topics covered: nature of the photographic process; light as applied to photography; factors in development; developing solutions; exposure; lenses and image formation; photographic light and lighting; fixing and washing processes; and principles and use of filters.

## 193. Practice of Photography I

Fall, 2 credits. Repeated in Spring

JAMES A. BEALES

This course furnishes laboratory practice and demonstration of the principles taught in Fundamentals of Photography I. It offers the student an opportunity to become familiar with recommended procedures and techniques. Topics covered: contact printing and processing; selection of printing papers; processing of negative roll film, cut film and film pack; diagnosis and remedy of processing defects; types of cameras, their operation and uses, and the application of filters. *Prerequisite:* Fundamentals of Photography I, or taken concurrently with Fundamentals of Photography I.

## 194. Art in Photography I

Fall, 2 credits

RICHARD C. BALL

Demonstration of various pictorial factors such as mass, line, form, contour, space, tone, and perspective. Training the student to recognize and use these compositional factors as aids in making more effective pictures.

May be taken concurrently with Fundamentals of Photography I.

## 195. Fundamentals of Photography II

Spring, 2 credits

JOSEPH A. SCHANTZ

Subjects included: practical sensitometry and gradation control; the theory of projection printing; the nature of photographic light, its characteristics, control and measurement; shutter types and their performance; chemistry of photographic processes and the use of color film. *Prerequisite:* Fundamentals of Photography I.

## 196. Practice of Photography II

Spring, 2 credits

JAMES A. BEALES

Subjects included: application of sensitometric measurements, projection printing, print correction, composite printing, lighting, rendition of form and texture, light patterns, the effect of light on color, toning and print quality analysis. *Prerequisite:* Practice of Photography I.

## 197. Art in Photography II

Spring, 2 credits

RICHARD C. BALL

Structure of head and torso. Lighting mood and tempo. Pictorial symbols. Color harmony. Movement and animation. Impact and domination. Trips, class projects and critiques planned to employ selective arrangements for maximum pictorial effect. *Prerequisite:* Art in Photography I or the equivalent as approved by the instructor.

## 270. Color Photography I—Camera Techniques

Fall, 2 credits

NORBERT L. YOUNG

Covers the general camera techniques of color photography and the use of current materials and equipment. Instruction in lighting, exposure, color balance and processing of monopak materials such as Kodachrome and Ektachrome.

chrome. Lectures and supervised studio and laboratory demonstrations. *Prerequisite:* Fundamentals of Photography II and Practice of Photography II or equivalent in training and experience.

### 271. Color Photography II—Printing Techniques

Spring, 2 credits

NORBERT L. YOUNG

Designed to cover in detail the Printon method of color printing. Instruction and laboratory work in the characteristics and processing of Printon; masking techniques; and color balance control. Lectures and supervised laboratory work. *Prerequisite:* Color Photography I.

### 360. Portrait Photography

Year, 2 credits each semester

ELBRIDGE C. PURDY

A studio and darkroom course that provides opportunity for practice. The student learns through individual guidance the subtleties of fine portrait work. Lighting, posing, composition, processing and re-touching. *Prerequisite:* Practice of Photography II.

### 011. Photographic Roundtable

Year, non-credit

ELBRIDGE C. PURDY and OFFICERS

The Roundtable has been formed to provide opportunity for the continued study of photography. The group meets twice each month during the regular school year. One meeting is devoted to constructive analysis of photographic work presented by members; the other meeting is devoted to presentation of information about new developments and techniques in photography and to other topics of current interest. The Roundtable sponsors an Annual Salon.

Registration is open to persons who have completed any of the courses in photography offered by the Graduate School. No fee is charged; registration, however, is required.

# Faculty

## FACULTY, DEPARTMENTAL AND SPECIAL COMMITTEES, AND PUBLIC LECTURERS

\* Faculty    ‡ Special Committee    † Departmental Committee or Sub-committee

- \*ABERDEEN, ESTHER, J., Ph.D., Chicago. Geologist, Geologic Division, U. S. Geological Survey, Department of Interior. Taught in Chicago, Milwaukee-Downer, Northwestern and Wellesley. (Physical Sciences)
- \*ABRAHAMSEN, MARTIN A., Ph.D., Wisconsin. Principal Agricultural Economist, In Charge, Purchasing Section, Cooperative Research and Service Division, Farm Credit Administration, USDA. Taught in West Virginia and North Carolina State. (Social Sciences)
- \*ACKER, LAURENCE W., C.P.A. Director, Internal Audit Division, Office of Comptroller, General Services Administration. Taught in Tyler Commercial College. (Public Administration)
- †ACKERMAN, CLARA B., M.A., George Washington. Editor, Extension Service Review, Extension Service, USDA. (Committee on Information)
- \*ADAMS, EVA B., LL.B., American. Administrative Assistant to Senator McCarran of Nevada, U. S. Senate. Taught in Nevada. (Public Administration)
- †ADCOCK, ROBERT E., M.S., Oklahoma A. and M. Chief, Training Section, Management Improvement Division, Office of Personnel Management, Production and Marketing Administration, USDA. Taught in Oklahoma A. and M. and Cameron State Agricultural College. (Committee on Correspondence Study and Extension Education)
- \*†ADELSON, SADYE F., M.A., California. Technical Assistant to the Chief, Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, USDA. (Technology)
- \*ALBEE, GEORGE W., Ph.D., Pittsburgh. Assistant Executive Secretary, American Psychological Association. Taught in Pittsburgh. (Social Sciences)
- \*††ALLIN, BUSHROD W., Ph.D., Wisconsin. Chairman, Outlook and Situation Board, Bureau of Agricultural Economics, USDA. Taught in Wisconsin. (Social Sciences)
- \*ALLSMAN, TEN M. F., Assistant Director, Office Methods Division, Administrative Office, Department of the Navy. (Office Techniques)
- \*ALPERT, HARRY, Ph.D., Columbia. Analytical Statistician, Division of Statistical Standards, Bureau of the Budget. Taught in Queens College, City College of the City of New York, Yale, and American. (Mathematics and Statistics)
- \*AMES, SARAH L., B.S., Alabama. Head, Directive Systems Section, Office Methods Division, Department of the Navy. (Office Techniques)
- \*AMIRIKIAN, A., C.E., Cornell. Head Designing Engineer, Bureau of Yards and Docks, Department of the Navy. Taught in Catholic and George Washington. (Technology)
- \*ANDERSON, LOUIS H., LL.B., Washington College of Law. Offset Composition Development Officer, Government Printing Office. (Languages and Literature)
- †APPELMAN, PAUL L., Examiner in Accounting, Administrative and Social Sciences Section, Examining Division, Civil Service Commission. (Public Administration)
- \*ARNOULD, JACK C., LL.M., University of Paris. Assistant to the Air Attaché, French Embassy. Taught in Georgetown. (Languages and Literature)
- †ASAY, IVAN, M.S., Syracuse. Chief, General Methods Branch, Division of Management Services, Office of the Surgeon General, Public Health Service, Federal Security Agency. Taught in Denver. (Public Administration)
- \*ASKEGAARD, DAVID, B.S., North Dakota State. Budget Officer, Office of Administrator, Rural Electrification Administration, USDA. (Technology)
- \*ATKINSON, JAY, Ph.D., Iowa State. Chief, Business Review Section, Office of Business Economics, Department of Commerce. Taught in Iowa State, Connecticut and George Washington. (Social Sciences)
- ††AYLESWORTH, PHILIP F., M.S., Purdue. Administrative Officer, Office of the Secretary, USDA. (Social Sciences)
- \*BACHMAN, KENNETH L., M.S., Harvard. Head, Farm Classification and Analysis Section, Division of Farm Management and Costs, Bureau of Agricultural Economics, USDA. (Social Sciences)
- †BAKER, GLADYS L., Ph.D., Chicago. Agricultural Historian, Bureau of Agricultural Economics, USDA. (Public Administration)
- \*BALDAUF, TONY M. Administrative Officer, Procurement and Property Management Division, Office of Budget and Finance, USDA. (Office Techniques; Public Administration)
- †BALL, LESLIE W., M.Sc., Manchester, England. Chief, Physics Research Department, Naval Ordnance Laboratory, Department of the Navy. (Physical Sciences)

- \*BALL, RICHARD C., Photographer, Service Operations Division, Office of Plant and Operations, USDA. (Technology)
- †BAMFORD, RONALD, Ph.D., Columbia. Dean, Graduate School, University of Maryland. (Biological Sciences)
- ‡BARTLETT, L. GEORGE, C.P.A., B.C.S., Southeastern. Reviewing Examiner, Examination Division, Farm Credit Administration, USDA. (Committee on Internal Audit)
- \*BARUCH, ISMAR, LL.B., George Washington. Chief, Personnel Classification Division, U. S. Civil Service Commission. (Public Administration)
- \*BAUER, MAGNA E., Auguste Victoria Lyzeum, Berlin. Historian Translator, Office of the Chief of Military History, Department of the Army. (Languages and Literature)
- \*BEACHAM, LOWRIE M., JR., B.S., South Carolina. Chief, Canned Foods Branch, Division of Food, Food and Drug Administration, Federal Security Agency. Taught in South Carolina. (Physical Sciences)
- \*BEALES, JAMES A., Assistant Chief, OII-INP, Department of State. (Technology)
- †BEAR, N. ROBERT, B.S., Ohio State. Chief, Division of Organization and Personnel Management, Office of Personnel, USDA. Taught in Ohio State and Michigan. (Public Administration)
- \*†BEAUCHAMP, GEORGE E., Ph.D., Northwestern. Associate Director, Commission on Occupied Areas, American Council on Education. Taught in Manchester College, Northwestern, and Nottingham. (Languages and Literature)
- †BECKNELL, HARVEY E., M.A., Columbia. Chief, Division of Training and Utilization, Office of Personnel Administration, Department of Labor. (Public Administration)
- \*BEEN, RICHARD O., M.A., George Washington. Economist, Division of Marketing and Transportation Research, Bureau of Agricultural Economics, USDA. (Mathematics and Statistics; Social Sciences)
- \*BELL, E. DONALD. Traffic Section, Southern Railway System. (Office Techniques)
- \*BELL, HARRY M., JR., B.S., Washington and Jefferson. Office Methods Division, Administrative Office, Department of the Navy. (Office Techniques)
- †BENTON, MILDRED C., A.B., George Washington. Librarian, Naval Research Laboratory, Department of the Navy. (Public Administration)
- ‡BERCAW, LOUISE O., Assistant Librarian, USDA. (Committee on Correspondence Study and Extension Education)
- \*BERGER, PETER, Pol.Sc.D., Vienna. Department of State. Taught in Catholic, Loyola and Georgetown. (Social Sciences)
- \*†BISHOPP, F. C., Ph.D., Ohio State. Assistant Chief, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, USDA. Taught in Colorado A. & M. and Maryland. (Biological Sciences)
- \*BLAKE, SIDNEY F., Ph.D., Harvard. Senior Botanist, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA. Taught in Stanford. (Biological Sciences)
- †BLICKENSCHERFER, J. P., Ph.D., Harvard. Editor, U. S. Quarterly Book Review, Library of Congress. Taught in Oklahoma, Washington, Harvard and Pittsburgh. (Languages and Literature)
- †BLOUGH, ROY, Ph.D., Wisconsin. Member, Council of Economic Advisers, Executive Office of the President. Taught in Chicago. (Public Administration)
- †BOGGS, S. W., M.S., Columbia. Special Adviser on Geography, Department of State. (Physical Sciences)
- \*BOTTS, RALPH R., B.S., Florida. Principal Agricultural Economist, Insurance Section, Division of Agricultural Finance, Bureau of Agricultural Economics, USDA. (Office Techniques; Public Administration; Social Sciences)
- †\*BOWLES, GORDON T., Ph.D., Harvard. Executive Secretary, Committee on International Exchange of Persons, Conference Board of Associated Research Councils. Taught in Harvard and Hawaii. (Social Sciences)
- \*BRAUM, DANIEL M., B.S.A., Kansas State. Head Training Officer, General Services Administration. (Office Techniques)
- \*BRENNAN, JOSEPHINE G., M.A., Bryn Mawr. Taught in Bryn Mawr. (Technology)
- \*†BREWSTER, JOHN M., Ph.D., Columbia. Marketing Research Analyst, Fats and Oils Branch, Production and Marketing Administration, USDA. Taught in Columbia. (Social Sciences)
- \*BROWN, DAVID S., A.B., Maine. Assistant Executive Secretary, Central Secretariat, Economic Cooperation Administration. Taught in Syracuse. (Public Administration)
- \*BRUNSCHWIG, LILY, Ph.D., Columbia. Psychologist, National Institutes of Health, Public Health Service, Federal Security Agency (stationed at Psychiatric Clinic, Juvenile Court, District of Columbia). Taught in Fisk. (Social Sciences)
- \*†BUCKLEY, JAMES L., LL.B., Georgetown. Assistant Director of Personnel, USDA. (Public Administration)
- \*†BURROUGHS, ROY J., Ph.D., Michigan. Principal Agricultural Economist, Division of Agricultural Finance, Bureau of Agricultural Economics, USDA. Taught in Michigan, Port Huron Junior College, and Michigan State. (Social Sciences)
- †BUTLER, K. A., B.S., Minnesota. Assistant Chief in Charge of Administration, Bureau of Animal Industry, Agricultural Research Administration, USDA. (Public Administration)



- \*CALDERWOOD, HOWARD B., Ph.D., Wisconsin. Specialist, International Organization, Office of United Nations Economic and Social Affairs, Department of State. Taught in Ohio, Wisconsin, and Michigan. (Social Sciences)
- †CALLAN, J. A. C., M.S., Union College. Chief, Standards Coordination Branch. Engineering Division, Office of Airports, Civil Aeronautics Administration, Department of Commerce. Taught in Union College and Alabama Polytechnic. (Technology)
- \*CANNON, EDWARD W., Ph.D., Johns Hopkins. Assistant Chief, Applied Mathematics Division, National Bureau of Standards, Department of Commerce. Taught in Johns Hopkins and Delaware. (Mathematics and Statistics)
- \*†CAVIN, JAMES P., Ph.D., Harvard. Head, Division of Statistical and Historical Research, Bureau of Agricultural Economics, USDA. Taught in University of Puerto Rico and Catholic. (Social Sciences)
- \*CHACE, FRED M., Ph.D., Harvard. Geologist, Mineral Deposits Branch, U. S. Geological Survey, Department of Interior. Taught in Brown and Harvard. (Physical Sciences)
- †CHAMBERS, THOMAS B., C.E., Alabama Polytechnic. Chief, Engineering Division, Soil Conservation Service, USDA. Taught in Alabama Polytechnic. (Technology)
- †CHAPLINE, ROBERT W., C.P.A. Assistant Chief, Examination Division, Farmers Home Administration, USDA. (Committee on Internal Audit)
- \*CHAPMAN, ROY A., B.S., Minnesota. Mathematical Statistician, Forest Service, USDA. (Mathematics and Statistics)
- \*CHRISTIE, HAROLD E., A.B., Indiana. Assistant Director, Information Division, Farmers Home Administration, USDA. (Languages and Literature)
- \*CHURCHILL, ETHAN D., B.S., Washington. Photographic Intelligence Officer, Headquarters, U. S. Air Force, Department of the Air Force. (Technology)
- \*CLARK, L. B., JR., Glass Technologist, Optics Division, Naval Research Laboratory, Department of the Navy. (Technology)
- \*CLARK, L. B., SR., B.S., California. Engineer, Nucleonics Division, Naval Research Laboratory, Department of the Navy. Taught in California, Catholic and San Francisco Research Laboratory. (Technology)
- \*CLEMENTS, FORREST E., Ph.D., California. Head, Division of Special Surveys, Bureau of Agricultural Economics, USDA. Taught in California, Yale, and Oklahoma. (Social Sciences)
- \*†COBB, EDWARD S., Head, Specifications and Tests, Research and Development Department, Naval Photographic Center, Department of the Navy. (Technology)
- †COCHRAN, H. DEAN, B.S., Colorado A. and M. Chief, Division of Personnel Management, Forest Service, USDA. (Public Administration)
- †COCHRAN, WILLIAM G., M.S., Cambridge. Professor of Biostatistics, Johns Hopkins University. Taught in Iowa State and North Carolina State. (Mathematics and Statistics)
- \*COLLINS, EMMETT B., B.B.A., Emory. Chief, Division of Audit, Office of Budget and Finance, USDA. (Office Techniques)
- \*COLNER, BERNARD J., A.B., Brooklyn. Cartographer, Division of Photogrammetry, U. S. Coast and Geodetic Survey, Department of Commerce. (Technology)
- \*COOK, RICHARD K., Ph.D., Illinois. Chief, Sound Section, Mechanics Division, National Bureau of Standards, Department of Commerce. Taught in Illinois. (Mathematics and Statistics)
- †\*†COOPER, JOHN C., A.B., Furman. Deputy Director, Office of Budget and Finance, USDA. (Committee on Internal Audit; Public Administration)
- †CORNELIUS, CARROLL, A.B., Illinois. Training Officer, Farmers Home Administration, USDA. (Committee on Correspondence Study and Extension Education)
- \*CORNFIELD, JEROME, B.S., New York. Chief, Research Studies Unit, Biometrics Section, National Cancer Institute, National Institutes of Health, Public Health Service, Federal Security Agency. Taught in American. (Mathematics and Statistics)
- \*CORNSEWET, ALBERT C., Ph.D., North Carolina. Chief Clinical Psychologist, Mental Hygiene Clinic, Washington Regional Office, Veterans Administration. Taught in Brown and North Carolina. (Social Sciences)
- †CORRELL, LYNNE M., M.S., Iowa State. Personnel Officer, Region 7, Forest Service, USDA. (Public Administration)
- \*†CORSON, JOHN J., Ph.D., Virginia. Management Consultant, McKinsey and Company. Past President, American Society for Public Administration. Taught in Virginia and American. (Public Administration)
- \*†COUCH, VIRGIL L., B.S., Kentucky. Deputy Assistant Administrator, Management Office, Federal Civil Defense Administration. (Office Techniques; Public Administration)
- \*COWING, AMY G., B.A., George Washington. Extension Educationist, Division of Field Studies and Training, Extension Service, USDA. (Languages and Literature)
- \*CRIST, C. L., Ph.D., Johns Hopkins. Chief, X-Ray Crystallographer Unit, U. S. Geological Survey, Department of Interior. Taught in Wesleyan (Connecticut) and Johns Hopkins. (Physical Sciences)
- †CRUMP, WARREN C., B.C.E., George Washington. Deputy Director, Technical and Production Department, Hydrographic Office, Department of the Navy. Taught in George Washington. (Technology)

- \*CULLINAN, FRANK P., Ph.D., Chicago. Assistant Chief, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA. Taught in Purdue. (Biological Sciences)
- †CURRIER, L. W., Ph.D., Syracuse. Geologist, U. S. Geological Survey, Department of Interior. (Physical Sciences)
- †CURTISS, JOHN H., Ph.D., Harvard. Chief, National Applied Mathematics Laboratories, National Bureau of Standards, Department of Commerce. Taught in Cornell and Harvard. (Mathematics and Statistics)
- \*D'ALESSANDRO, ALFRED, C.P.A., M.A., Harvard. Federal Trade Commission. Author of "Foundation of Accounting." (Public Administration)
- \*†DALY, JOSEPH F., Ph.D., Princeton. Statistician, Bureau of the Census, Department of Commerce. Taught in Catholic and Princeton. (Mathematics and Statistics)
- \*DANIELS, MARIETTA, M.A., Washington at St. Louis. Associate Librarian, Pan American Union. Taught in Universidad Central de Quito and Universidad Nacional, Santiago. (Languages and Literature)
- \*DANTZIG, GEORGE B., Ph.D., California. Mathematical Advisor to the Comptroller, Department of the Air Force. Taught in California and American. (Mathematics and Statistics)
- †DAVIS, FLOYD E., M.S., Ohio State. Head, Livestock and Wool Division, International Commodities Branch, Office of Foreign Agricultural Relations, USDA. (Social Sciences)
- †DAVIS, JOHN CORDON, M.S., Ohio State. Economist, Council of Economic Advisers, Executive Office of the President. Taught in Michigan State. (Social Sciences)
- †DAVIS, LOA E., M.A., Columbia. Extension Economist, Extension Service, USDA. (Social Sciences)
- †DAVIS, RAYMOND, Photographic Technologist, National Bureau of Standards, Department of Commerce. (Technology)
- †DEERING, ARTHUR L., D.Sc., Maine. Dean, College of Agriculture, University of Maine. (Social Sciences)
- \*DELANEY, MAURICE S. A., Cartographic Engineer, U. S. Hydrographic Office, Department of the Navy. (Technology)
- †DELOACH, D. BARTON, Ph.D., California. Associate Head, Division of Marketing and Transportation Research, Bureau of Agricultural Economics, USDA. Taught in California and Oregon State. (Social Sciences)
- \*DE MARNE, HENRI, Baccalaureat, Université de Paris. Instructor in French, University of Maryland. (Languages and Literature)
- \*†DEMING, W. EDWARDS, Ph.D., Yale. Adviser in Sampling, Bureau of the Budget. Taught in Wyoming, Colorado, and Yale. (Mathematics and Statistics)
- \*DEVEREAUX, MARY C., M.A., Michigan. Technical Librarian, Atomic Energy Commission. Taught in St. Catherine, Wisconsin, Florida State, and Catholic. (Languages and Literature)
- †DEVRIES, P. H., M.A., Michigan. Chief, Commodity Programs Division, Information Branch, Production and Marketing Administration, USDA. Taught in Michigan State. (Committee on Publications)
- †DEXTER, WAYNE V., B.S., Kansas State. Information and Editorial Specialist, Division of Economic Information, Bureau of Agricultural Economics, USDA. (Committee on Information)
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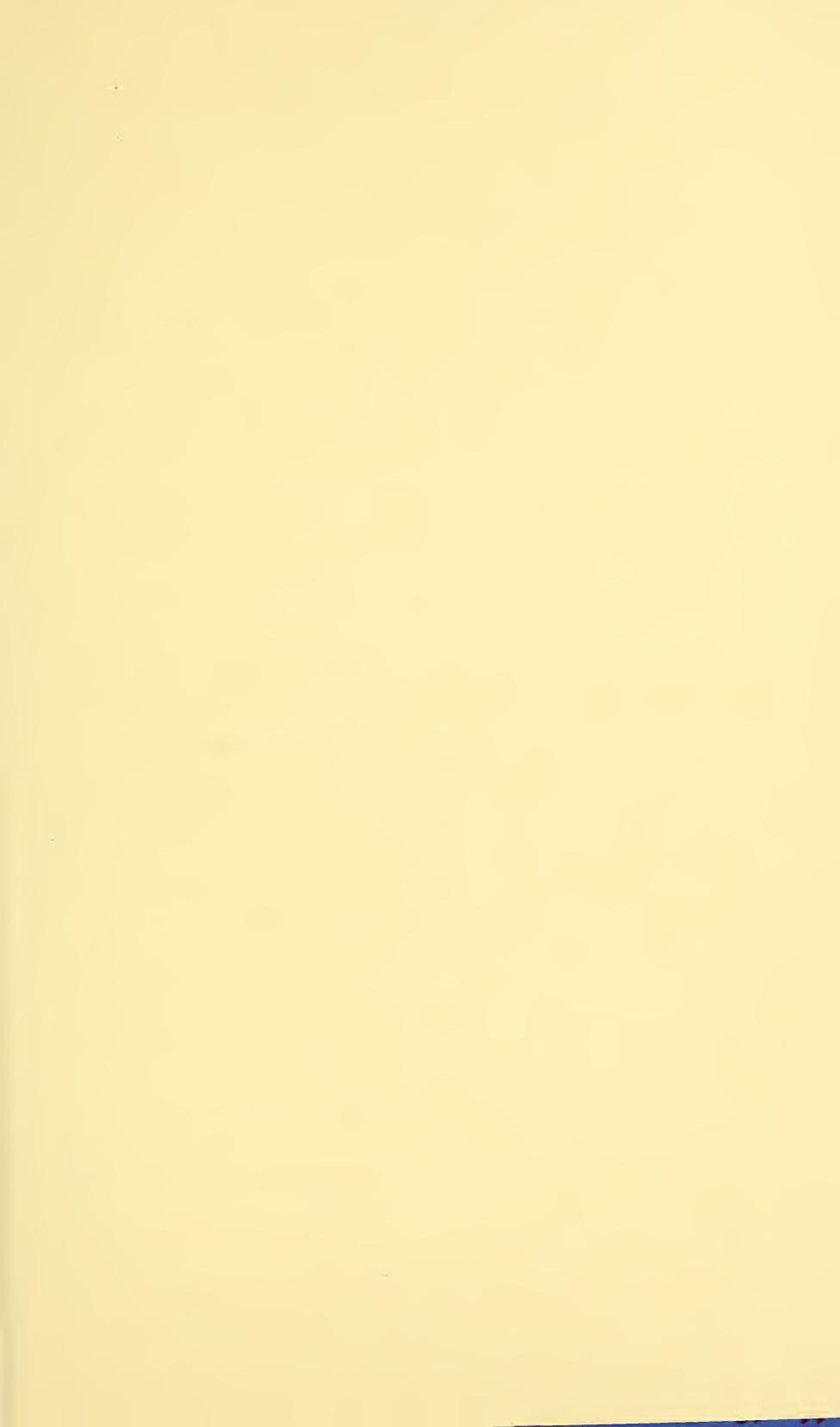
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